DIESEL PROGRESS

IN INDUSTRY • IN TRANSPORTATION • ON THE SEA • IN THE AIR

FIVE DOLLARS PER YEAR

JUNE, 1955

FIFTY CENTS PER COPY

You can CUT DIESEL POWER COSTS

JUST REMEMBER, the most famous name in diesel lubrication—*Texaco Ursa Oil*. There is a complete line of these outstanding lubricating oils especially refined and processed to make diesel, gas and dual-fuel engines deliver *more power* with *less fuel* over *longer periods* between overhauls.

Thus, whatever your engines, you can be sure of clean operation—freedom from sludge and harmful deposits. Rings will stay free and valves function smoothly for proper compression and combustion. You'll use less fuel, spend less for maintenance.

These benefits, consistently delivered, help explain why—

For over 20 years, more stationary diesel h.p. in the U. S. has been lubricated with Texaco than with any other brand.

A Texaco Lubrication Engineer will gladly help you select the proper *Texaco Ursa Oil* for your operation. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

☆ ☆ ☆

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

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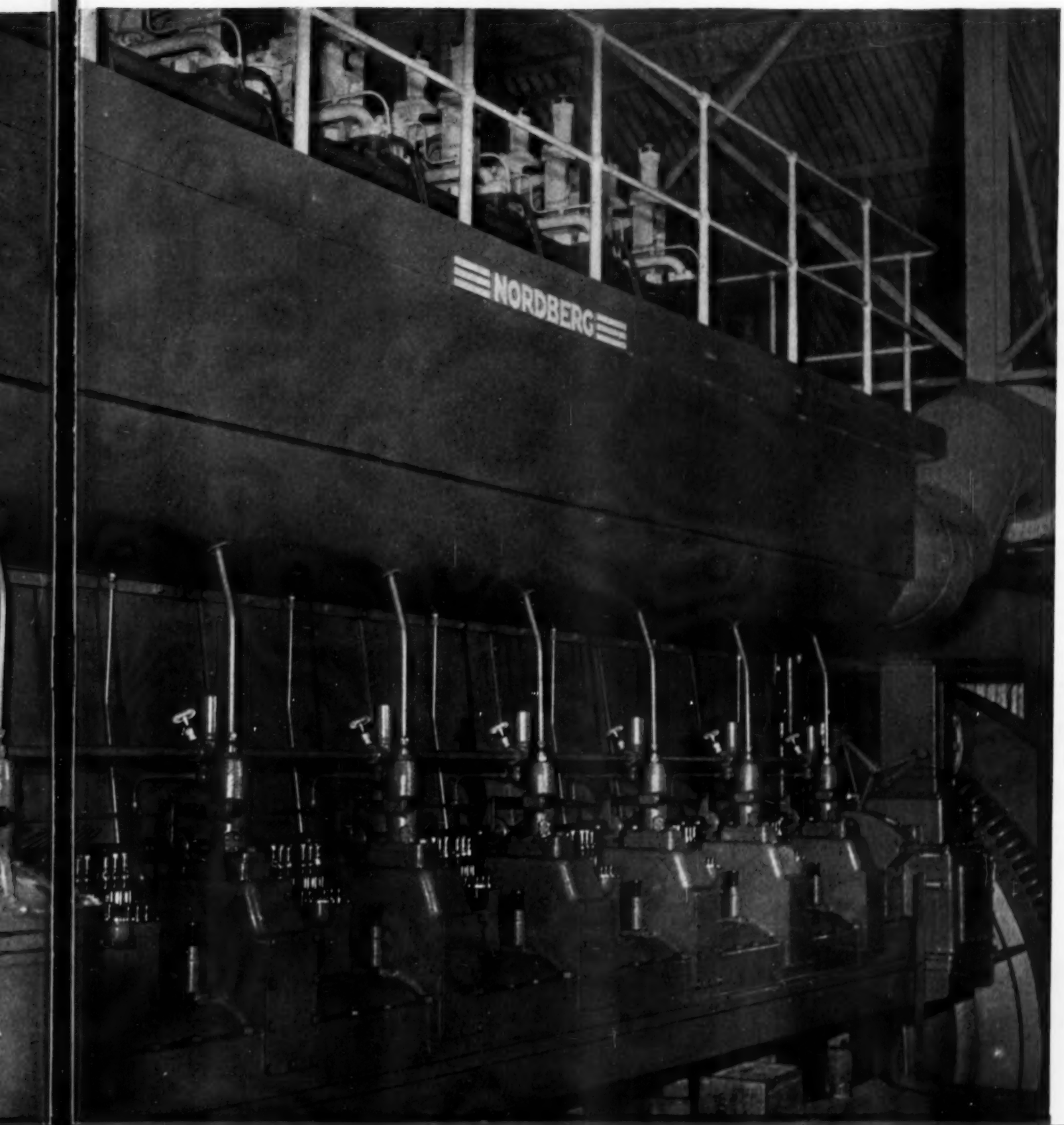
TEXACO STAR THEATER
starring JIMMY DURANTE
or DONALD O'CONNOR
on television
... Saturday nights, NBC

TEXACO



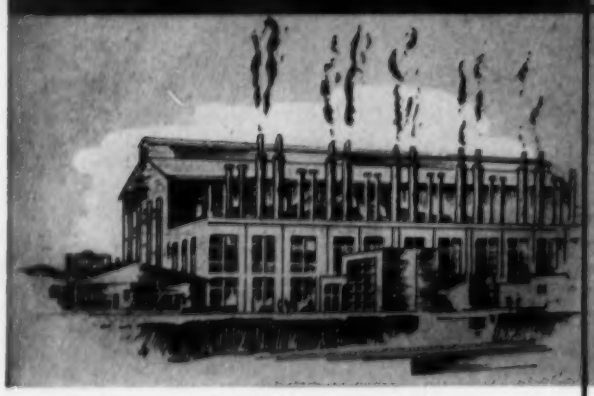
URSA OILS

FOR ALL DIESEL, GAS
AND DUAL-FUEL ENGINES

Dependable

Transmission of Power . . .

ERIE FORGE
Diesel Crankshafts!



Here's the "Giant in the Diesel" . . . transmitting power that drives the modern railroad engines, pushes huge ships speedily and surely through the waves, or runs the power plants of business and industry. Erie Forge crankshafts are produced — from pouring of ingot to finished product — in our own plant. Every step is under the complete control of experienced craftsmen . . . one control, one responsibility. At Erie Forge you get the full benefit of our know-how and experience in the production of highest quality crankshafts — of exactly the right material to meet the most rigid requirements. Consult with Erie Forge on your next shafting requirements.

ERIE FORGE & STEEL CORPORATION
ERIE, PENNSYLVANIA

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IN INDUSTRY · IN TRANSPORTATION · ON THE SEA · IN THE AIR

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EDITORIAL AND PRODUCTION OFFICES

816 N. La Cienega Blvd. Los Angeles 46, Calif.

BUSINESS OFFICES

NEW YORK 20:
DIESEL PROGRESS
604 Fifth Ave.
JUdson 6-4820

CHICAGO 2:
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4-5555

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Business Publications Audit of Circulation, Inc.

DIESEL PROGRESS for June, 1955, Vol. XXI, No. 6. Published Monthly by Diesel Engines, Inc., 816 N. La Cienega Blvd., Los Angeles 46, California. Phone BRadshaw 2-6273. Subscription rates are $5.00 for U.S.A. and possessions. All other countries $7.50 per year. Subscriptions may be paid the London office at £2-12s-6d per year. Acceptance under 34.64, P. L. & R., authorized.

DIESEL PROGRESS is indexed regularly by Engineering Index, Inc.

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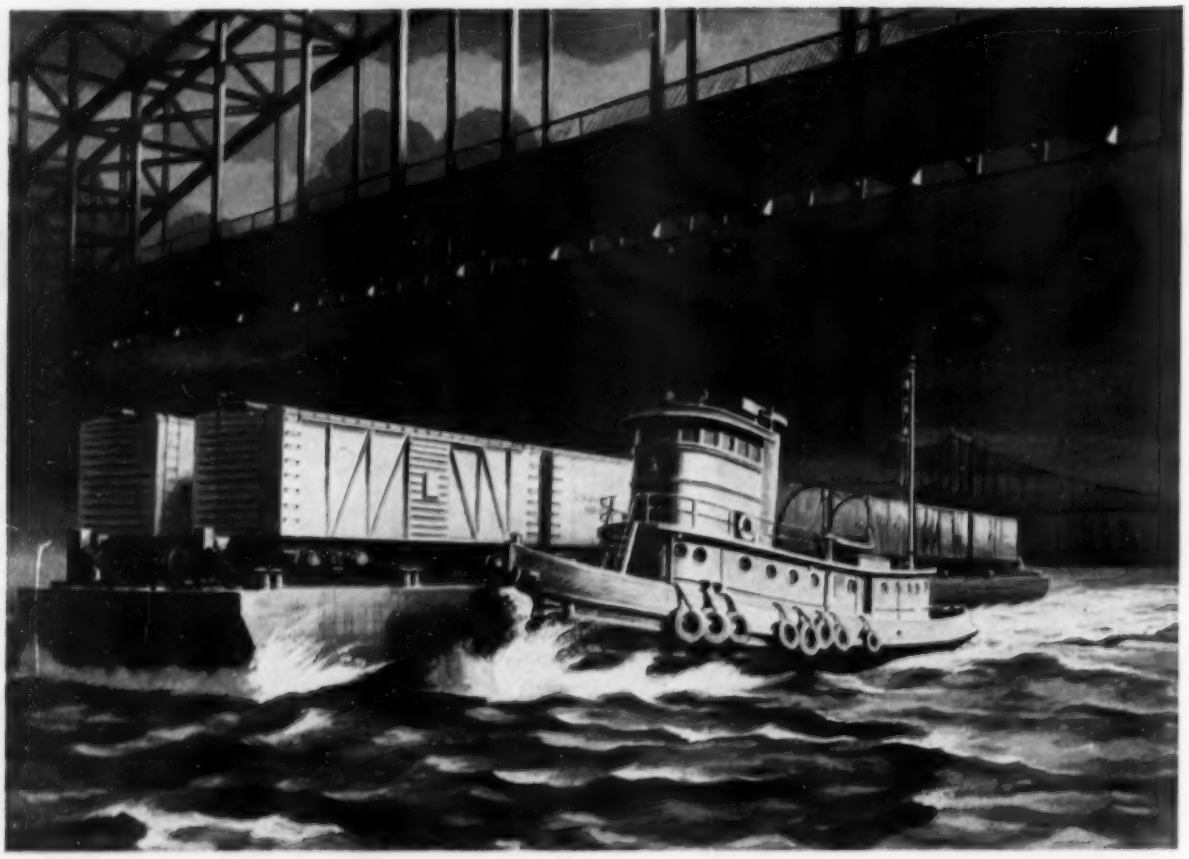
FRONT COVER ILLUSTRATION

Rubber-tired Tournatractor, manufactured by LeTourneau-Westinghouse Corp., engaged in land levelling. Buda, Cummins and General Motors diesel engines are offered as power. For details on this unit, turn to page 48.



HELL GATE HATH NO FURY

For a GM Diesel-Electric Tug

Hell Gate—a whirling mass of treacherous currents—guards the route between New York's Hudson and East Rivers. It's a good place to steer clear of, but every day General Motors Diesel-Electric tugs make the trip with heavy, unwieldy tows.

GM Diesel-Electric Drive masters this tough run for the tug captains. They control engine power from the pilothouse—can switch from full ahead to full astern without waiting for bell signals to the engine room. This means instant maneuverability, safer towing, faster trips.

And with GM Diesel power, these tugs can work three full shifts around the clock. And they can keep working for a month or more without refueling.

High availability plus fast maneuverability adds up to more work at less cost for tug operators—means that fewer GM Diesel-Electric tugs are needed by operators. Your nearest Cleveland Diesel Engine Division Office can give you full details on GM Diesel-Electric Drive—can show you how to cut your water transportation costs. Write or call today for complete information.

CLEVELAND DIESEL ENGINE DIVISION

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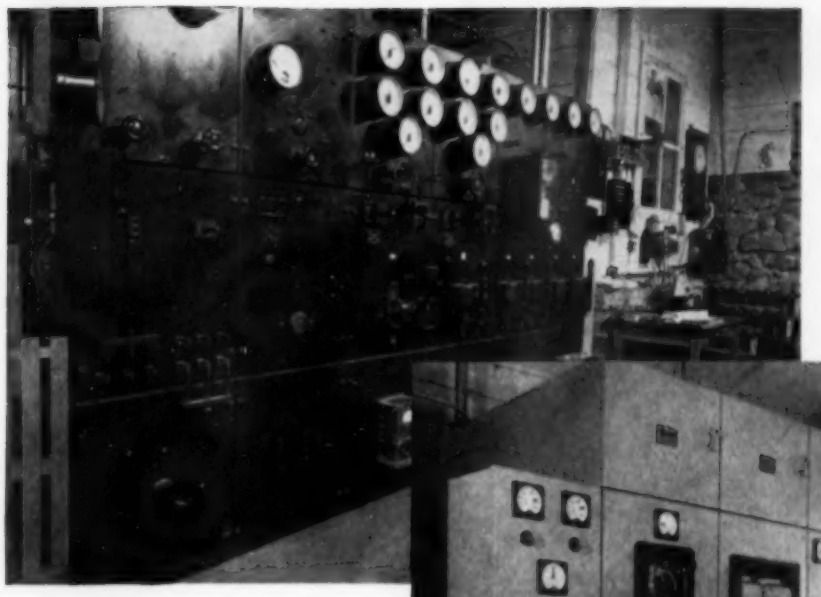


◀ Old

Old switchgear at Big Falls, Minnesota hydroplant of Border Counties Power Cooperative, Inc. System expansions had caused this board to become dangerous by today's standards, capacity insufficient, and increasingly tedious to handle.

New ▶

Custom-designed by E-M from standard components, this new switchgear at Big Falls gives extra safety and convenience. All apparatus is completely enclosed, yet readily accessible because of E-M's specially designed Swing-Door Instrument Panels. Operation, inspection, and testing is safe, convenient, and simple.

Making switchgear meet power system expansions

● Power systems grow larger . . . and larger . . . and larger. Electrical apparatus of all types must keep pace with this rapid expansion. The plant switchgear, with its vital safety and control functions, must be closely matched to increased demands made upon it.

At Border Counties Power Cooperative, Inc., size of the system *tripled*. Having had previous experience with E-M's personalized engineering assistance and with the safety and service of E-M designed apparatus, they called on E-M engineers to work out the new switchgear with consulting engineers R. D. Thomas and Associates.

Equipment necessary to handle the greatly increased system had to be fitted deftly into available space. This made E-M's Swing-Door Instrument Panel a natural choice, as this panel makes use of every available inch of space, both on door and interior of cabinet. Mounted on hinges, the Swing-Door Panel opens as a door to reveal a compact, easy-to-reach arrangement of components, all accessible without reaching across buses or terminals. The E-M Switchgear is designed for tomorrow's increased loads as well, with breakers of adequate interrupting capacity.

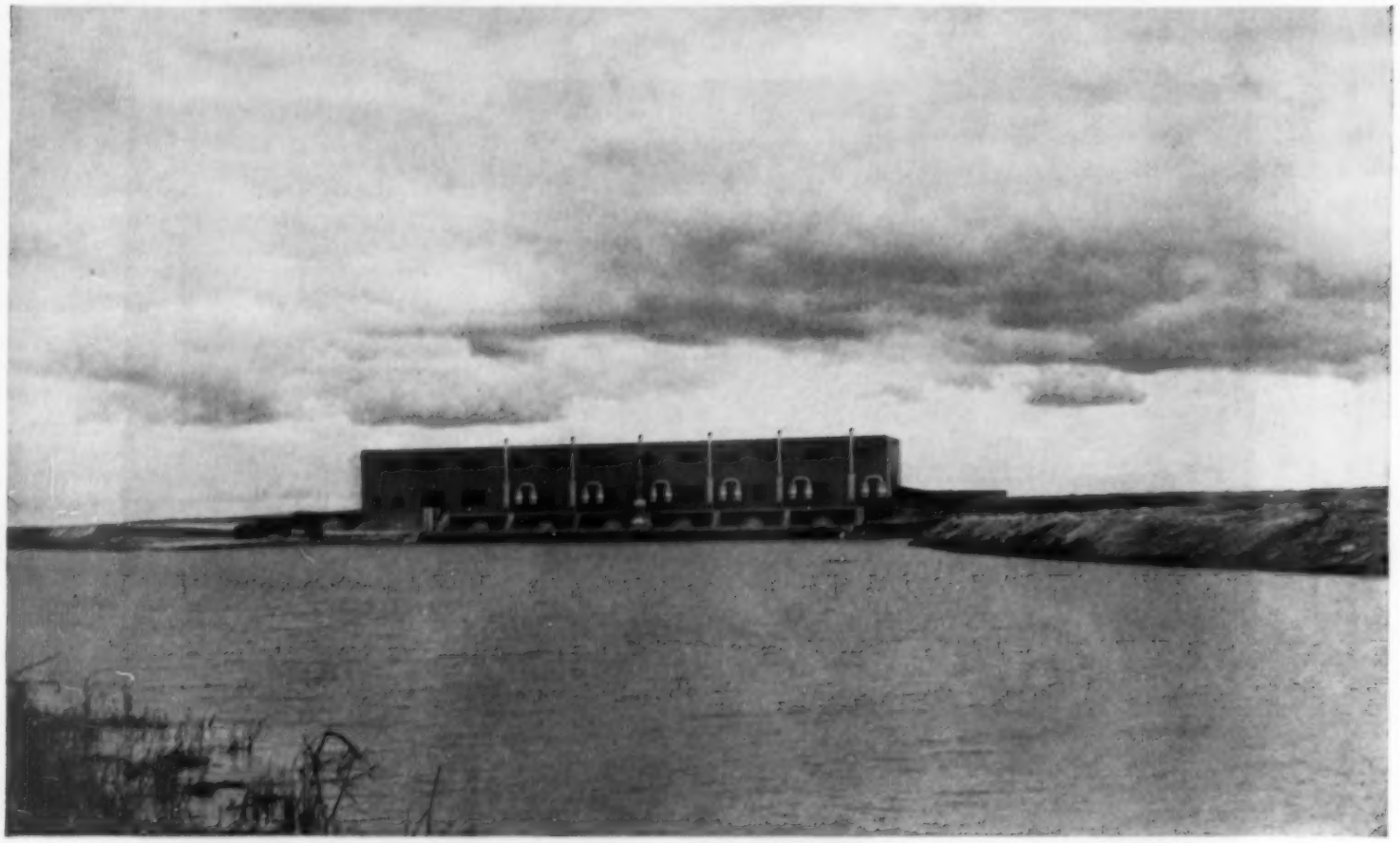
"Personalizing" of E-M Switchgear, as was done at Big Falls, means that each E-M board is *matched exactly* to what it will encounter in daily service. This complete, attentive, and highly specialized E-M engineering can be of service to you. Call your nearest E-M sales engineer for more facts, and be sure to write the factory for E-M Switchgear Publication No. 194.

ELECTRIC MACHINERY MFG. COMPANY
MINNEAPOLIS 13, MINNESOTA

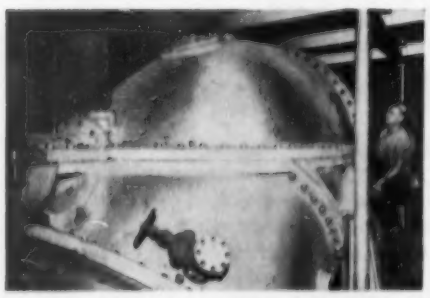
Specialists in **MODERN SWITCHGEAR DESIGN**

E-M

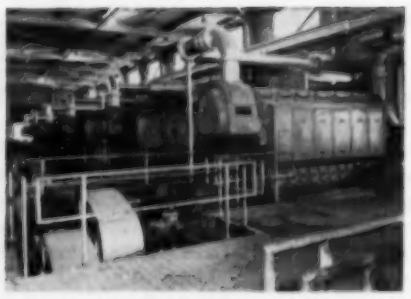
4200-TPA-2163



World's largest pumping station tames Everglades



Each giant 89-ton pump is equal to the floor space of the average-sized living room. The huge four-bladed, air-foil propeller moves water through the pump at the rate of 360,000 gallons a minute.



Six 1600-hp. Fairbanks-Morse Opposed Piston Diesel Engines insure uninterrupted power for the big pumps, especially during storm periods when they will be most urgently needed.

Floridians who have counted their flood loss in thousands of lives and millions of dollars bitterly refer to Lake Okeechobee as the Killer Lake.

Now, with the completion of the world's largest self-powered pumping station, there is the promise of forever taming the Everglades' rampaging waters.

Located at the southern tip of the lake, the station houses six of the world's largest pumps . . . built by Fairbanks-Morse . . . powered by Fairbanks-Morse Opposed Piston Diesel Engines.

Each pump can deliver over 500 million gallons a day. That's more water than is consumed each day by the entire population of Florida. Put all six of these giant 89-ton pumps in operation and you can pump nearly three times the daily consumption of the city of New York.

We at Fairbanks-Morse are proud to be a part of one of the largest engineering projects on the face of the earth—and the country-wide acceptance it typifies. This endorsement and wide selection in the F-M line of 50,000 pump models assures you of finding the *one* pump best suited to your pumping requirements. When next you need a pump, look for the one made by the world's largest pump manufacturer—Fairbanks-Morse. Ask your nearby Fairbanks-Morse Field Pump Engineer for assistance on your specific problem, or write to Fairbanks, Morse & Co., 3601 Kansas Avenue, Kansas City, Kansas.

FAIRBANKS-MORSE

a name worth remembering when you want the best

PUMPS • WATER SYSTEMS • GENERATING SETS • MOWERS • MAGNETOS • MOTORS • SCALES • DIESEL LOCOMOTIVES AND ENGINES

NEW POWER PACKAGE in dramatic debut!

AiResearch Turbocharger makes major boost in horsepower on huge Caterpillar D9 diesel tractor!

MIGHTIER THAN EVER BEFORE, the new giant Caterpillar D9 Tractor equipped with a small but potent AiResearch Turbocharger pushed record tons of dirt during tests at Proving Grounds and in the field. Application of this Turbocharger to these big tractors increased their original horsepower to their present brawny rating.

Caterpillar Tractor Co. pioneered the installation of AiResearch Turbochargers as standard equipment on production machinery . . . with exciting results! Never before in earthmoving history has such a small, light power package provided such a tremendous increase in power, *and with no additional fuel cost!*

In addition, the Turbocharger quiets the engine better than any muffling device without any of the loss of power caused by mufflers!

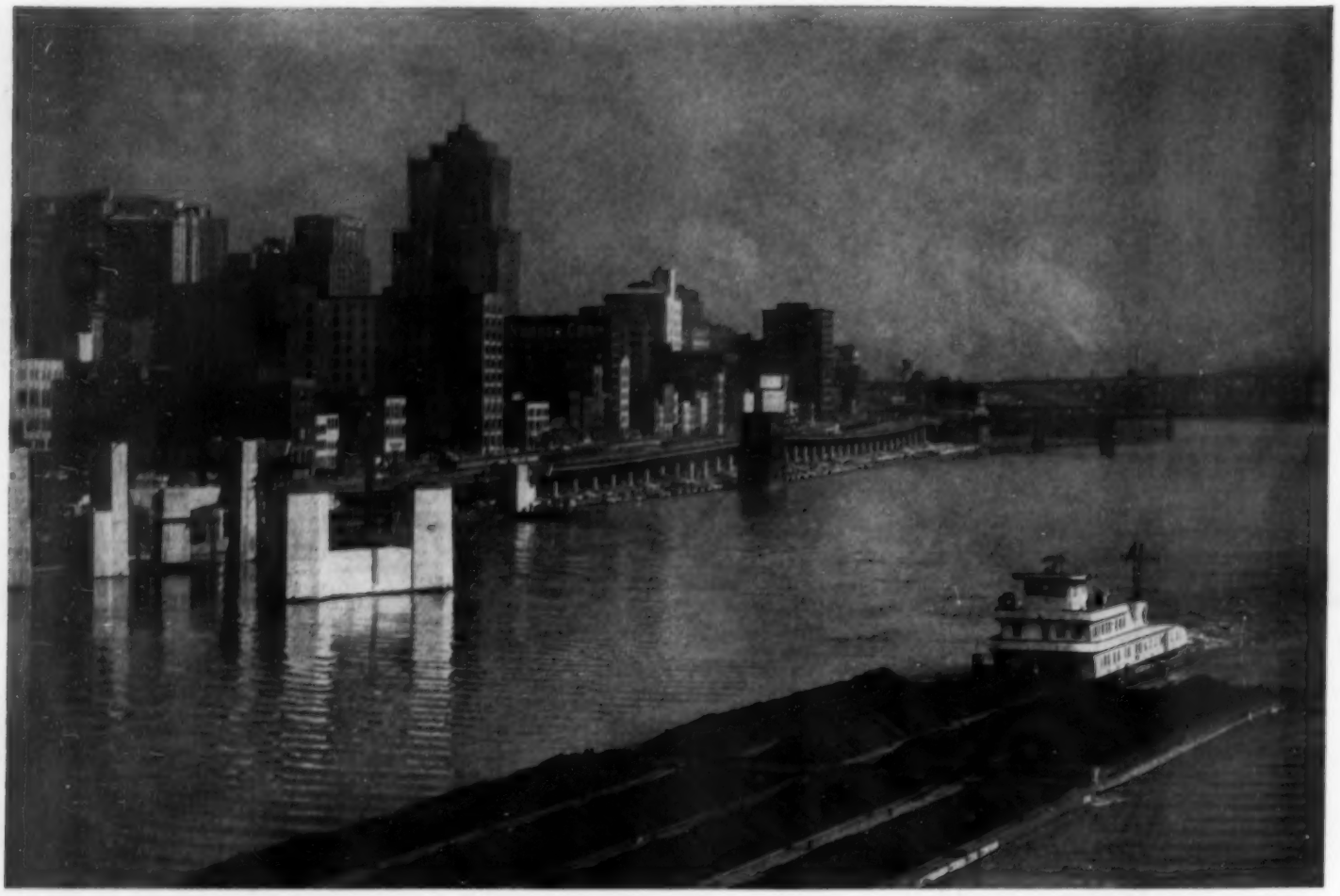
The new Turbocharger, reflecting more than a decade of leadership in the development and production of radial turbines and compressors, has had more than 25,000 hours of laboratory and field testing. It again demonstrates the ability of AiResearch to produce small packages that do big jobs for industry. Your inquiry as to its adaptation and application to your equipment is invited.

THE GARRETT CORPORATION

AiResearch Industrial Division

9225 Aviation Blvd., Los Angeles 45, Calif.

DESIGNERS AND MANUFACTURERS OF TURBOCHARGERS AND RELATED MACHINERY



The towboat, *Crane*, is shown pushing loaded coal barges into the Ohio River at Pittsburgh on the way to Ohio Valley Electric Company's Kyger Creek Power Plant. St. Louis Shipbuilding Company built the *Crane* and sister ship, *Mike Creditor* . . . will finish a second sister ship, *A. L. Long*, for June commissioning.

Ohio River Company calls for more when

Baldwin Diesel power proves efficient on M/V "A. H. Crane"

Performance of twin Baldwin Diesels on their M/V *A. H. Crane* showed Ohio River Company that Baldwin Diesel power is efficient, dependable, economical. They came back for more. Now the *Crane's* Baldwins are duplicated on the *Mike Creditor* (commissioned in February) and the *A. L. Long* (to be commissioned in June).

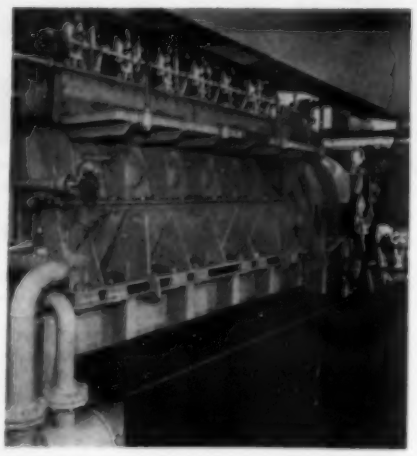
The *Crane* easily handles tows equivalent to 360 fifty-ton railroad coal cars (twenty 1000-ton barges) at a minimum fuel cost. Maintenance has been no problem at all.

Find out how *you* can tow more, spend less with Baldwin Diesel power. Write us today for complete details!

Hamilton Division • Hamilton, Ohio

BALDWIN-LIMA-HAMILTON

The Crane's two 6-cylinder, 4-cycle, 12¾ x 15½ turbocharged Baldwin Diesels each develop 1080 hp at 625 rpm. Their low weight per horsepower, rugged construction and high efficiency over a wide range of output make possible constant peak performance at low operating cost with minimum maintenance.



NEW STANODIESEL OIL M

A new stationary industrial engine lubricant developed specifically to meet problems posed by new engine designs, higher loads, economy fuels

New STANODIESEL Oil M meets—and with plenty to spare—the performance requirements imposed on diesel lubricants by new engine designs, higher loads and the use of economy fuels. It meets these requirements because, first of all, it is an oil refined from the finest quality base stocks. It thus has superior stability. Then additives exclusive with STANODIESEL Oil M have been blended with these base stocks. The additives do these things:

1	**INHIBIT OXIDATION.** Prevent unwanted increases in oil viscosity. Prevent corrosion of bearings.
2	**PROVIDE DETERGENT-DISPERSANT ACTION.** Keep crankcase, pistons, cylinder walls and other parts clean. Keep contaminants in suspension, prevent redeposit.
3	**PROVIDE ANTI-FOAM ACTION.** Foaming tendencies of oil are controlled. Oil is suitable for use in hydraulic governors.
4	**INCREASE LUBRICITY.** Wetting agent increases oil's ability to reach and maintain a film on highly stressed parts.

STANODIESEL Oil M is a "Mil" type oil.

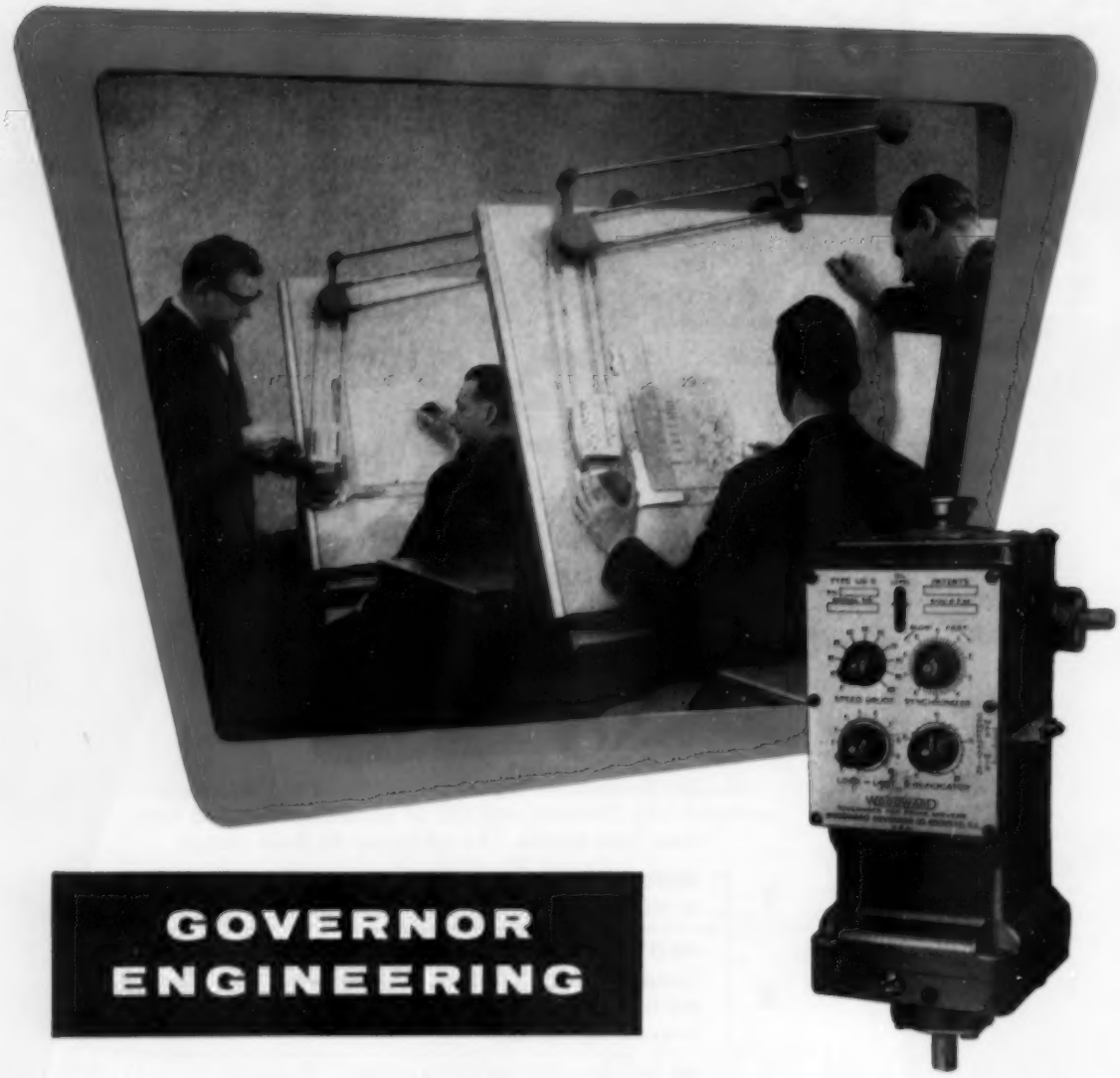
Your next move? Find out how STANODIESEL Oil M can serve you. In the Midwest call your nearby Standard Oil lubrication specialist. Or contact Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

STANODIESEL OIL M
Does these things for your engine

1. Lessens engine deposits, ring and cylinder wear.
2. Lessens spark plug fouling.
3. Lessens fuel injector and pump sticking resulting from engine deposits.

STANDARD

STANDARD OIL COMPANY (Indiana)



GOVERNOR ENGINEERING

● Woodward engineers bring specialized knowledge and years of practical experience to focus on precision governor applications. Their design skills are available for your particular prime mover control problem.

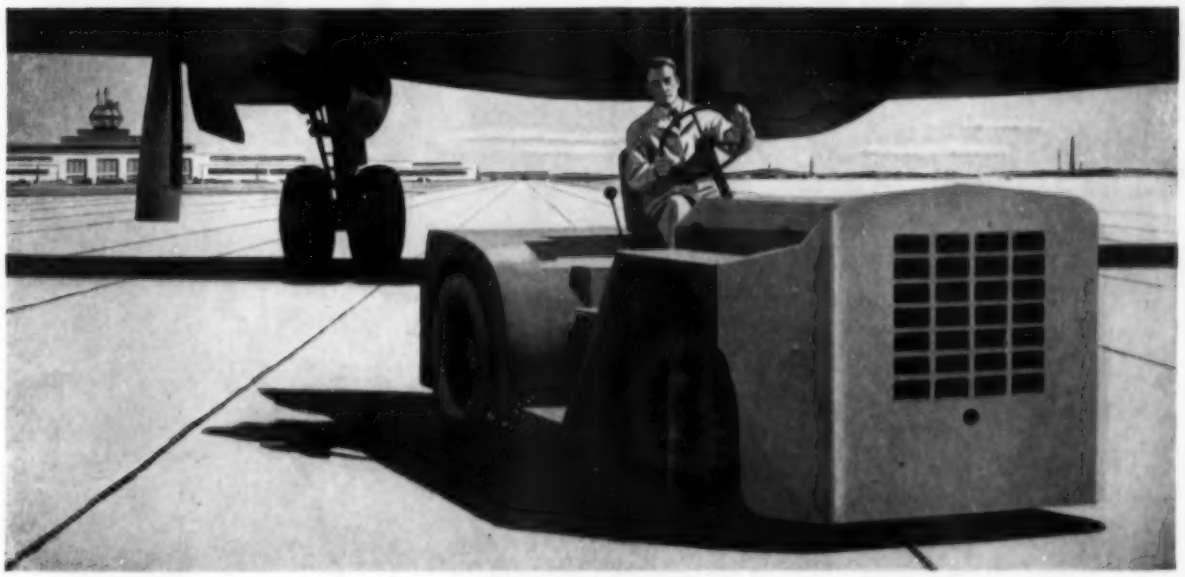
WOODWARD GOVERNOR COMPANY

Rockford, Illinois

WORLD'S OLDEST AND LARGEST MANUFACTURER OF HYDRAULIC GOVERNORS FOR PRIME MOVERS

For rolling pavements

or towing planes



take this TORQMATIC tip

THERE'S A big difference between these two pieces of equipment but they've got one thing in common—their Allison TORQMATIC Converter-Continental Engine team.

In the Galion Roll-O-Matic roller, TORQMATIC power transmission provides a complete hydraulic cushion that makes for really smooth pavements. It means no gears to shift, quicker pickup, 10% more work per day with fuel consumption cut as much as 25%.

And in the Unitow Industrial Tractor it means smoother, steadier towing of huge bombers and commercial planes —that will not damage even the most fragile nose-wheel strut.

Allison's small, compact, *completely self-contained* 200-300 Series TORQMATIC Converters fit *both* gasoline and Diesel engines in the 40 to 150 horsepower range. They bring shock-free power transmission to a wide range of equipment—protect the entire drive line from harmful shock loads. They more than *triple* engine torque—broaden the engine's working horsepower range.

These converters are easy to maintain, too. They carry their own oil supply—have a simple dip stick to check oil level. They are the first complete converter package in these sizes on the market with integral oil cooler, sump and charging pumps. Many model options including front or rear disconnect clutches, governor drives and optional flanges designed to meet most installation requirements are available.

You can *specify* Allison TORQMATIC Converters or Transmissions in a wide range of equipment from road rollers to giant off-highway trucks. Ask your equipment dealer or manufacturer about TORQMATIC DRIVES next time you buy, or write direct for more complete information. Allison Division of General Motors, Box 894D, Indianapolis 6, Indiana.

GM TORQMATIC

Allison

TORQMATIC DRIVES

DIESEL ENGINE OPERATORS

A NEW PM TOOL

ADC* Oilprint Analysis

CHECKS CRANKCASE OIL IN MINUTES

Shell Research gives you new oil-change yardstick—

Now—operators can test crankcase oil in the short time allotted for refueling and crankcase oil checks. The Shell ADC Oilprint Analysis gives a practical and accurate oil evaluation in minutes.

ADC Oilprint Analysis means big savings when used in your preventive maintenance program . . . gives valuable information on engine and oil conditions. It answers the question "When do I change my oil?" thus eliminating the draining of usable oil and the risk of using oils loaded with contaminants.

See for yourself how the new Shell ADC Oilprint Analysis can save you money in preventive maintenance. Let us show how you can use this new service for your diesels.

SAVES... Time, Money, Engines, Oil

*Trademark

SHELL OIL COMPANY,

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100 BUSH STREET, SAN FRANCISCO 6, CALIFORNIA

SHELL

FAMOUS LAST WORDS:

"it can't happen here"

Let's face it — it can. Being ready for emergencies has become a part of our daily life, whether we like it or not. The emergency may be an atom bomb—or it may be a fire, a flood, a tornado. It's good business to be ready for it —whatever it is. Take these precautions TODAY.

- ☐ Enlist the help of your local Civil Defense Director.
- ☐ Check contents and locations of first-aid kits.
- ☐ Send staff to Red Cross courses. They may save your life.
- ☐ Promote preparedness in your community. Your local CD Director can show you how.

Set the standard of preparedness in your plant city — check off these four simple points NOW.

SPACE FOR THIS **CIVIL DEFENSE** MESSAGE CONTRIBUTED BY

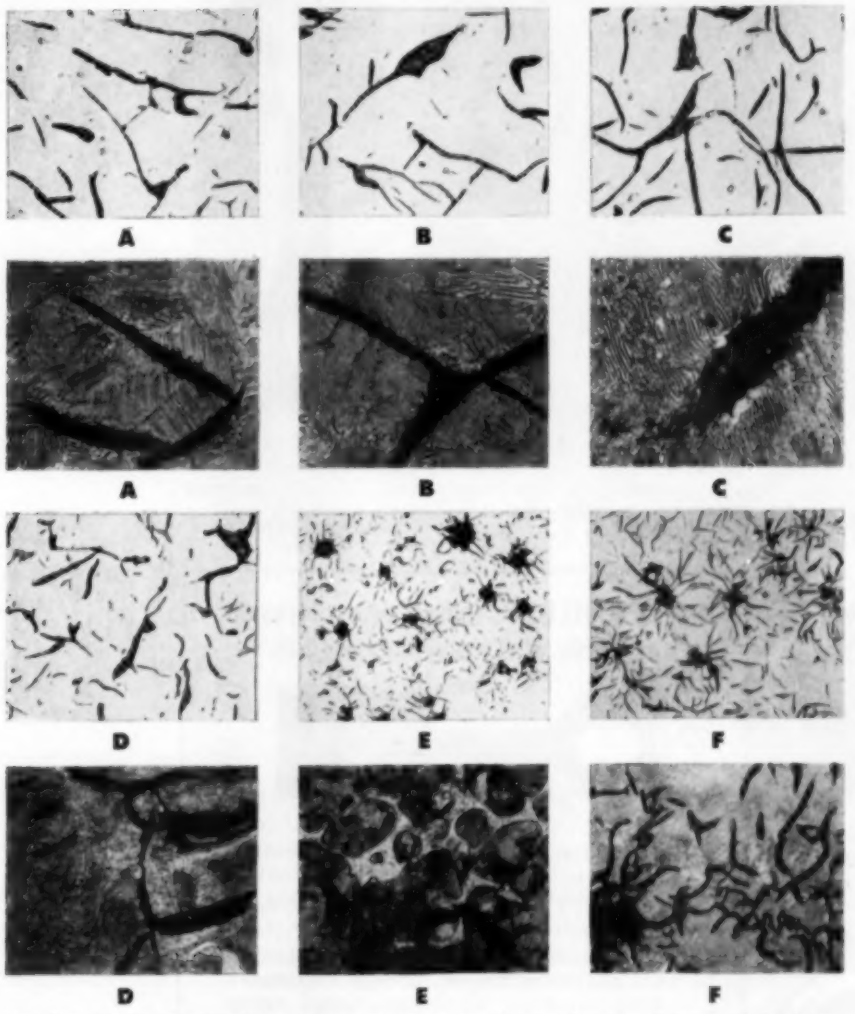
R. H. Wadman

100% TO 500% LONGER OPERATING TIME

Between Renewals—In All Types Of Engines With

DaRoS PISTON RINGS

Only DaRoS Piston Rings Come in These Many Different Metallurgical Structures!



UPPER micro-photographs "A, B, C, D, E, F" show texture of some of DaRoS Metals—unetched—magnified 100 times. LOWER micro-photographs "A, B, C, D, E, F" are the same DaRoS Metals as shown above—etched—2% nital—magnified 500 times.

This increased operating time is accomplished because of 50% to 90% *less wear* on rings and cylinders. DaRoS metals are "tailored" to meet the varying requirements of different size and type engines.

Take, for example, a 20,000-hp. Marine Diesel operating at 85 rpm with heavy, corrosive fuel. Its metallurgical requirements are quite different from a smaller-bore Railroad diesel operating at 1000 rpm with 1600 psi cylinder pressures. Different, too, are the requirements of an Aircraft Engine with steel cylinder liners, burning high-octane gasoline.

Only DaRoS produces rings with such "wear-resisting" metals for ALL types and sizes of engines. DaRoS Rings out-last all others—that means longer operating time between renewals. DaRoS Rings out-perform all others—that means a more efficient operation with lower maintenance cost.

- The high graphitic content—uniformly distributed is indicated by the black areas in the micro-photographs of DaRoS' metals shown on the left.
- DaRoS Iron Hardness: DRUM Castings—170 to 240 Brinell. INDIVIDUAL Castings—230 to 290 Brinell.
- DaRoS Iron Tensile Strength: DRUM Castings—34,000 PSI to 37,000 PSI MINIMUM. INDIVIDUAL Castings 37,000 PSI to 44,000 PSI MINIMUM.

Hardness and tensile strengths vary with rings sizes and type of castings used.

(This is the fourth ad of a series designed to bring to Diesel Operators in the Western Hemisphere the important story about DaRoS Swedish Iron Rings made by Ab Davy Robertsons Maskinfabrik, Gothenburg, Sweden.)

IMMEDIATE Delivery from Chicago on Popular Ring Sizes for Industrial Engines

DaRoS AMERICAN CORPORATION

D. D. COOK, *President*

8128 N. Lawndale Avenue

Skokie (Suburb of Chicago), Illinois U.S.A.

Distributors for North, Central and South America

DaRoS American Corporation
8128 N. Lawndale Ave., Skokie, Illinois
Gentlemen: Send me complete information on DaRoS Rings.

NAME_____

FIRM NAME_____

STREET ADDRESS_____

CITY_____ STATE_____

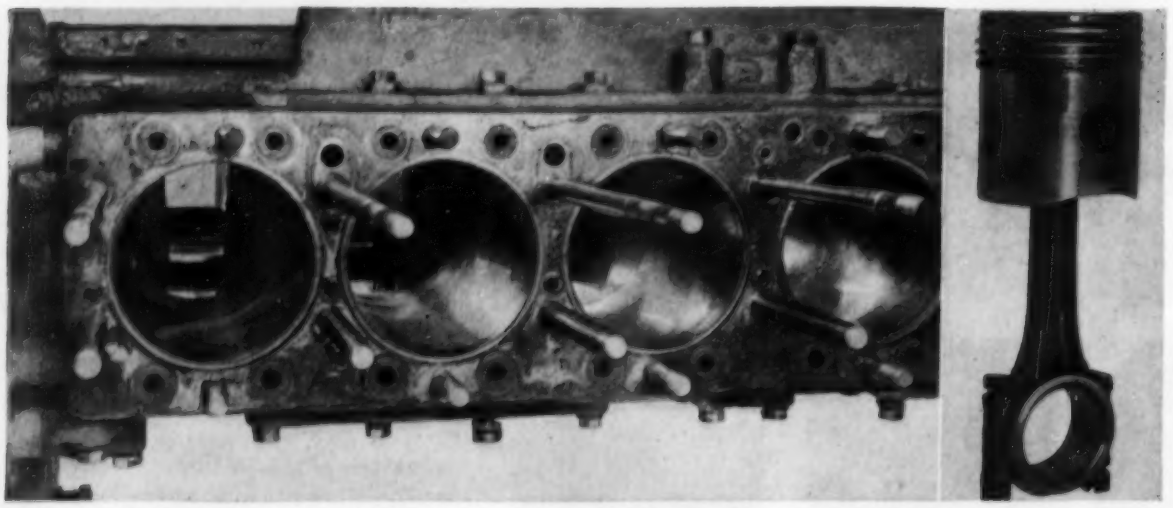
The Engineer's Report

CASE HISTORY

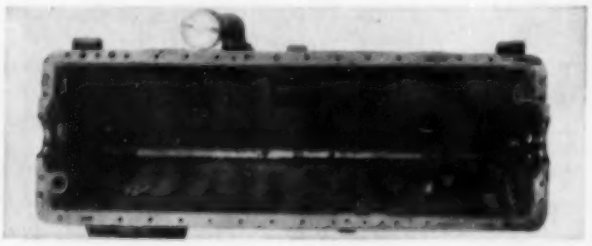
LUBRICANT RPM Delo Oils

FIRM Boise-Winnemucca Stages Inc., Boise, Idaho

Cylinder wear only 0.006″ after 228,413 miles!



USING RPM DELO SPECIAL LUBRICATING OIL, this 180-H.P. Fageol engine went 228,413 miles without repairs of any kind, in a bus owned by Boise-Winnemucca Stages, Inc. It ran in intense summer heat and sub-zero winter temperatures on the line's regular route. Wear on cylinders measured only 0.004" to 0.006" and crankshaft journals were still factory standard. All rings were free, all bearings good and pistons showed no varnish. There was no measurable wear on crankshaft or wrist pins.



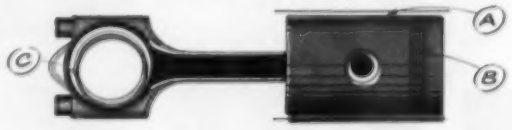
REMOVED FOR FIRST TIME, oil pan shows no deposits, clean metal is visible after draining. RPM DELO Oils reduce wear and keep engines clean in all of the buses owned by Boise-Winnemucca Stages.

FREE FOLDER tells you about all the RPM DELO Oils and how they meet every heavy-duty engine condition. Write or ask for it today.

FOR MORE INFORMATION about petroleum products of any kind or the name of your distributor, write or call any of the companies listed below.

RPM DELO LUBRICATING OILS

How RPM DELO Oils reduce wear, corrosion, oxidation in all heavy-duty engines



A. Contain special additives that provide metal-adhesion qualities...protect parts whether hot or cold, running or idle.

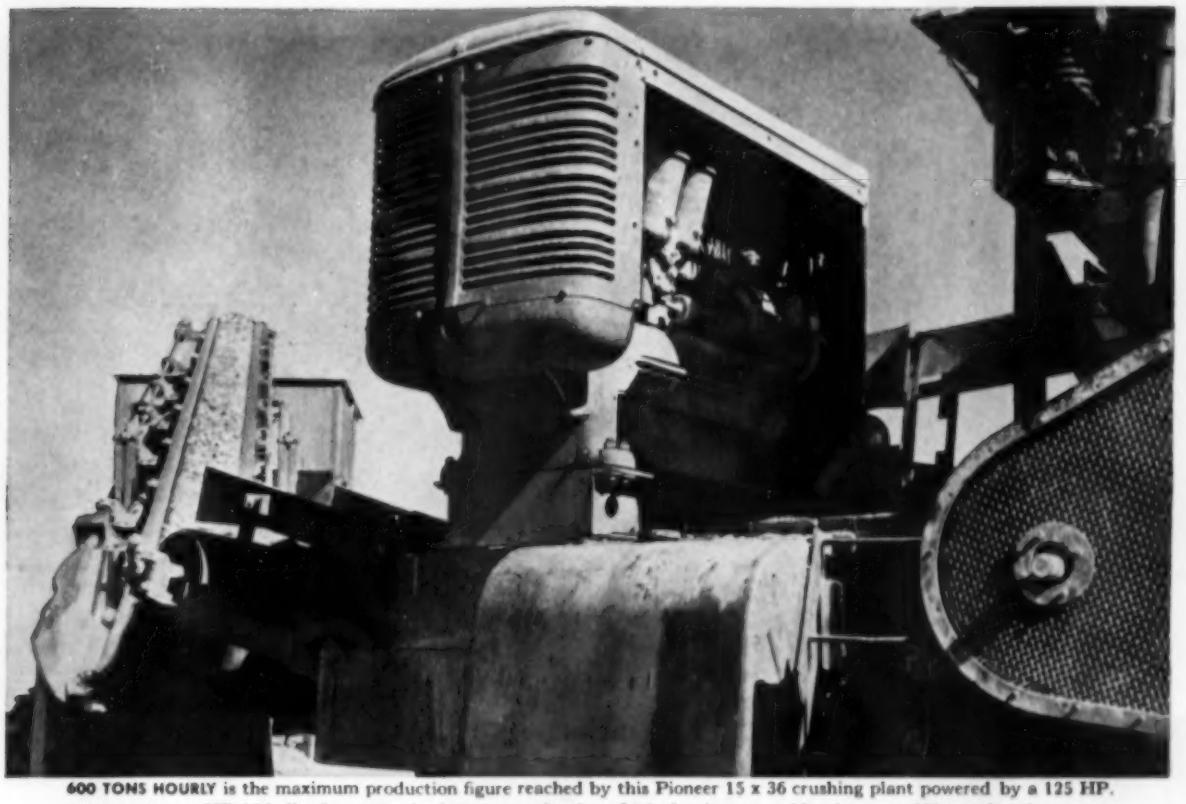
B. Anti-oxidant resists deterioration of oil and formation of lacquer...prevents ring sticking. Detergent keeps parts clean...helps prevent piston scuffing.

C. Special compounds stop corrosion of any bearing metal and foaming in crankcase.

TRADEMARK "RPM DELO" REG. U.S. PAT. OFF.

STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20 • STANDARD OIL COMPANY OF TEXAS, El Paso
THE CALIFORNIA OIL COMPANY, Barber, New Jersey • THE CALIFORNIA COMPANY, Denver 1, Colorado

"We Just Keep 'em Greased and Work 'em Hard"



600 TONS HOURLY is the maximum production figure reached by this Pioneer 15 x 36 crushing plant powered by a 125 HP. INTERNATIONAL UD-18A diesel power unit. Average production of 3-inch minus gravel levels out at 450 tons hourly.

Colorado crushing plant owner gets 8,000 hours of high production from INTERNATIONAL UD-1091 and UD-18A diesels without a single repair

The crushed rock really rolls out of the portable crushing plants owned by the Sundling Construction Company, Livingston, Montana, with two INTERNATIONAL Diesel Power Units providing the dependable, heavy-duty power.

In a period of two years, this 125 HP. INTERNATIONAL UD-18A has been driving a Pioneer 15 x 36 crushing plant and a 190 HP. INTERNATIONAL UD-1091 has been powering a larger Pioneer crusher for a total of 8,000 hours with no repairs.

As owner R. J. Sundling says: *"We can't take time to pamper engines on our crushing plants. We just keep 'em greased and work 'em hard. That's why we insist on* INTERNATIONALS."

For more than 50 years, International Harvester has been the world's leading producer of heavy-duty engines, having pioneered and perfected such features as all-weather starting, positive reserve torque control, valve-in-head construction, induction hardened crankshafts, and dust and dirt protection for long engine life.

There are 18 rugged and reliable models in the INTERNATIONAL line to meet your every pit or quarry need . . . six diesels in 4- and 6-cyclinder models . . . five 4-cylinder and seven 6-cylinder carbureted power packages . . . ranging from 16.5 to 200 net horsepower.

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INDUSTRIAL POWER
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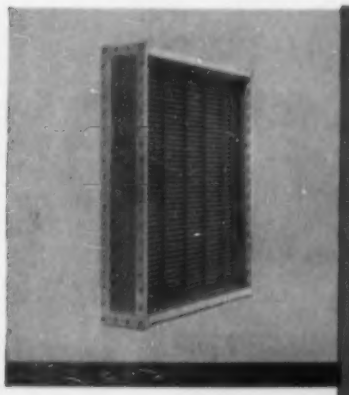
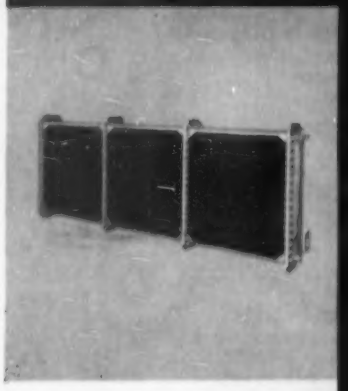


COOL ZEPHYR!

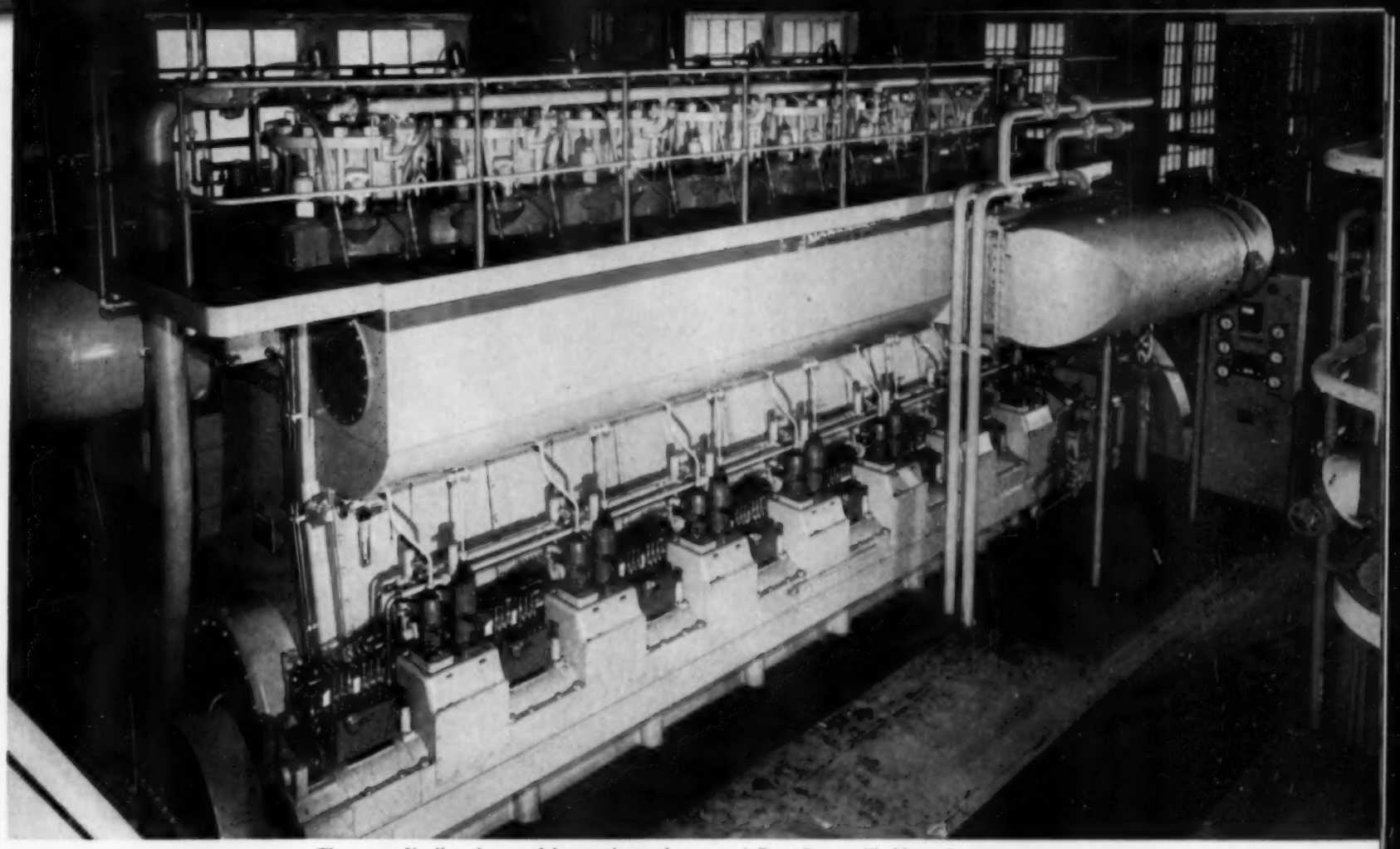


Everywhere west! . . . 11,000 miles of rugged rail-blazing across 14 states! That's the hot, grueling run of the Burlington Zephyrs! But these ultra-modern streamliners streak through with cool confidence to meet split-second schedules! And Harrison heavy-duty lube oil and jacket water coolers are on the job—keeping Diesel engines cool. Like the Burlington Zephyrs, the majority of modern Diesel locomotives rely on Harrison coolers for compact efficiency and dependable performance. If you have a cooling problem, look to Harrison for the answer!

HARRISON RADIATOR DIVISION, GENERAL MOTORS CORP., LOCKPORT, N. Y.

HARRISON

TEMPERATURES MADE TO ORDER



The newest Nordberg has an elaborate air supply system. A Roots-Connersville blower is engine driven, and the air flow controller on the by-pass adjusts the quantity of air discharged. Lubricators are Manzel.

SAN ANTONIO PORTLAND CEMENT ADDS NEW ENGINES

TWO dependable duafuel engines are carrying the base load for the big plant of the San Antonio Portland Cement Co., San Antonio, Texas. Utilizing inexpensive natural gas and a meager quantity of pilot oil, (an average of 6½ gph to each engine) power generation is economical and has proved more reliable than purchased power for this large installation. With a production capacity of 2,000,000 barrels of Portland Cement a year, the four kilns, two slurry thickeners, crusher and four finish cement mills demand a large amount of electric power. Of course, the electric load is a variable depending on mill operation, and the present load varies from 3000 to a peak of 6000 kw.

In 1948, a 3600-hp, 9-cylinder, 21½x29, Nordberg, high-pressure, duafuel engine, rated at 3600 bhp, was installed as the first step in a power plant modernization program. The second unit of the two-engine, base load combination is a 7-cylinder, 21½x31, two-cycle, Nordberg, duafuel engine, rated at 3010 bhp, which utilizes low pressure gas admission. Installation of the later engine was completed in June, 1953.

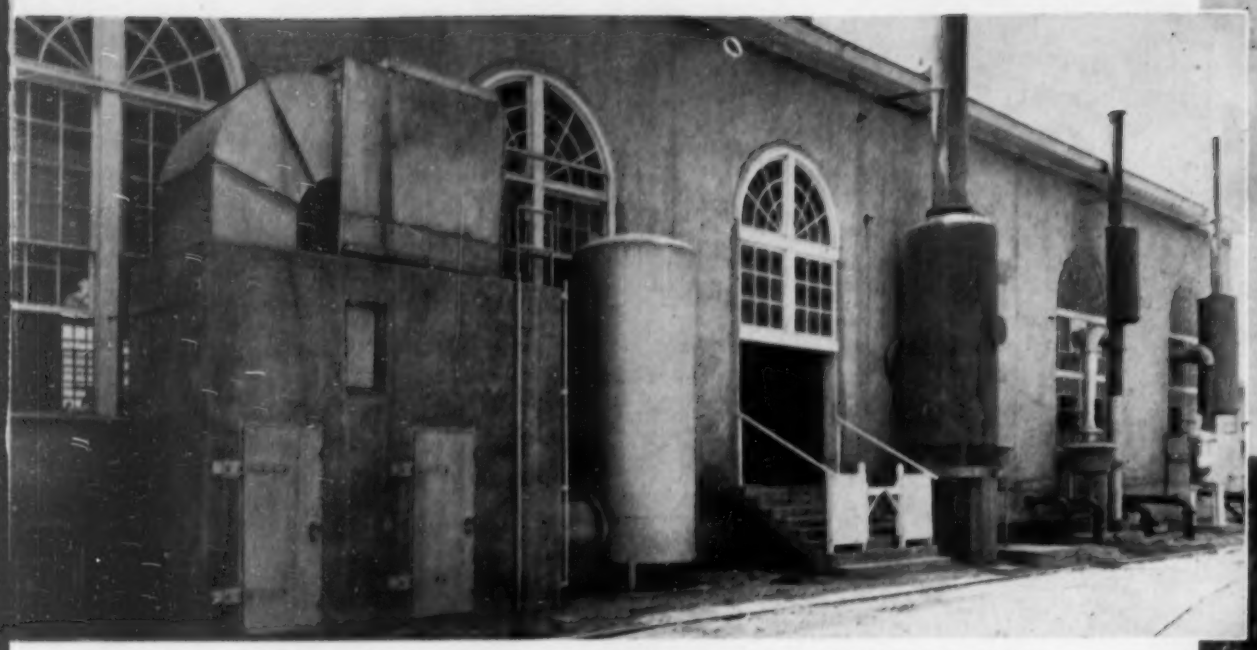
During the twelve-month period ending in July, 1954, the two Nordberg engines compiled an enviable record for hours on the line. The 3600-hp unit delivered 13,330,000 kwhs during 7909 hours of service, representing actual operation 90.2% of the time. For the same period, the smaller engine operated 6149 hours and produced 9,195,000 kwhs. Prior to the installation of the second engine, the 9-cylinder engine completed one 12-month period with the startling record of just 53 hours off the line, which means actual service 99.4% of the time. Although power plant operation does not usually demand full-time service for the new 7-cylinder engine, it has been on the line over 90% of the time during four calendar months in the past year.

L. C. Michell, chief engineer, believes in operating his engines with a load of 2000 kw on the larger engine and 1650 kw on the smaller. When the base load requirements fall, resulting in a low, uneconomical load on the smaller engine, one of the older engines in the plant is substituted. This results in the lower use factor for the newer engine. Although each engine is not equipped with separate gas meter, occasionally operation of the power plant permits accurate gas flow determination to a single engine. These tests have shown that the fuel flow is about 10.2 cu. ft. per kwh. For the 3010-hp engine, the pilot oil flow averaged 6 gph. Using this figure for the 6149 hours in the 12-month period previously discussed, when 9,195,000 kwhs were generated, the pilot oil consumption was a low 0.00402 gal. per kwh for an entire year. Combined with the 10.2 cu. ft. per kwh gas consumption, this adds up to efficient and economical power.

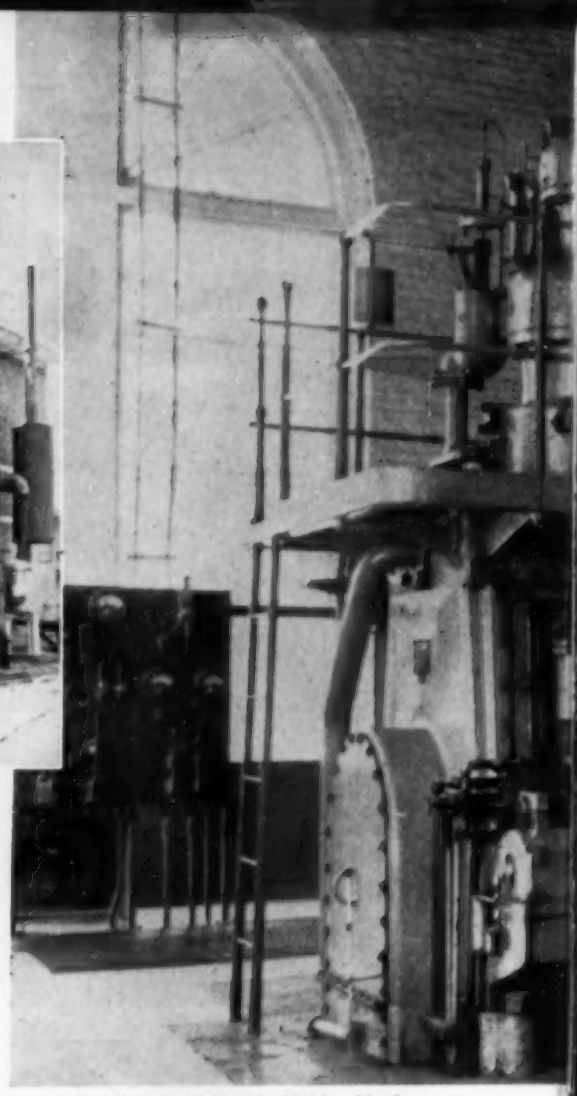
As the progressive San Antonio Portland Cement Co. has expanded to meet the increased demand for its product, the power plant serving the mill has kept pace. In 1914, a two-cylinder oil engine filled the bill, while today 8 engines totaling 14,750 horsepower are required to supply the mill and the workers' village on the spacious grounds. In 1926, the management began the installation of a series of oil engines starting with a 1000-hp, 8-cylinder engine. Now there are five of these engines ranging in size from 1000 hp to 2000 hp, all of which were converted to dual fuel in 1948. A 640-hp Busch-Sulzer engine was installed in 1938 and it is the only oil-burning engine still in service. (See DIESEL PROGRESS, December 1940.)

Cement mill expansion surpassed the capacity of the power plant in 1948 and for a period of three years it was necessary to purchase some power.

Interruptions in this service, either with or without warning, while never severe, were five to six times more frequent than interruptions from the power plant. The capacity of the plant is firm, but with 6610-hp in two engines, these engines must be available a large part of the time. In fact, no engine in the plant is given extensive maintenance unless the operation of the engine has indicated some probability of the need for overhaul. Engine cylinders are checked with an indicator at frequent intervals.



A Marley cooling tower atop the air filter housing serves as an evaporative cooler and air washer for the incoming air. The Burgess-Manning snubber for the 3010-hp Nordberg is to the right of the open door.



Installed in 1948, this 3600-hp Nordberg, high pressure, Duafuel engine has compiled an enviable record for dependability. During one 12-month period it was on the line 99.4% of the time.

Natural gas, with a higher heating value averaging 1000 btu per cu. ft., is supplied to the cement mill and power plant at 60 to 65 psig. Indicative of the cement mill's size is the fact that it is the largest single user of natural gas in San Antonio. In fact, this plant uses more gas than all government agencies in the area. A gas scrubber was installed for the first gas-burning Nordberg, but experience proved that a scrubber was not needed for the gas being supplied and the gas main for the newer engine feeds directly to the engine through a regulator. Gas pressure on the header at the engine is 20 psig.

Fuel oil is purchased in the area and delivered to the underground storage tank by truck. Oil is pumped from the main tank to the individual day tank. A centrifugal separator is used to treat all of the fuel oil before it flows to the day tanks.

Since the engine installations are similar, but not identical, the following description pertains to the newest duafuel engine. Fuel from the day tank is pumped through the strainer where the pilot oil injectors and the gas valve actuators take suction. Pilot oil injection is independent of load, while the governor regulates the actuators to govern the engine. Should the flow of gas stop, the engine automatically switches to straight oil combustion.

With the high ambient temperatures that are so common to the Southwest, the air induction system is carefully engineered. Outside air is precooled and washed by evaporative cooling on the suction side of the intake silencer and filter. A small, package-type cooling tower is used for the evaporative cooler. The low relative humidity, which is common in San Antonio, insures excellent cooling of the air. After passing through the filter, the air enters the engine-driven, lobe-type, scavenging blower. A cooler after the blower reduces the temperature again so if enters the manifold to the cylinders at less than 100°f. Air flow is automatically varied for engine load with a controller actuated by exhaust temperatures. Compressed air operates a butterfly valve in the by-pass line which connects the discharge and suction side of the blower. In this manner, air is recirculated through the blower at low loads to maintain a high exhaust temperature with the attendant economy.

Mineral oil is used in the lubricating system. Filtration is provided by a by-pass type purifier using a fullers earth cartridge. The cartridges are changed when the condition of the oil, observed through a sight glass, indicates the need. Filter life is about six months. An induced draft fan cooling tower cools the water which is circulated through the oil cooler, then through the heat exchanger on the closed jacket water system, and returned to the tower. A separate line supplies cool water to the air cooler on the discharge of the scavenging blower.

A well instrumented alarm and gauge panel is located near the generator end of the engine. Alarms are installed for water and lube oil pressure and temperature, and for high or low level in the fuel tank. Gauges indicate various oil and water pressures including the pressure of starting air which is drawn from a plant-wide system. Electrical generation and distribution is at 480 volts. Since the power plant is located near the load center, the low voltage distribution is permitted. A modern electrical panel extending along one wall of the building is the distribution center to the principal sections of the mill.

The six older engines in the plant include five Rathbun-Jones dual-fuel engines, which were converted from their original status of oil engines, and one 640-hp Busch-Sulzer oil engine which produces 437 kw. Two of the Rathbuns are rated 2000 hp each and contribute 1320 kw. Of the other three, the 1500-hp unit delivers 990 kw; the 1115-hp engine, 765 kw; and the 1000-hp Rathbun-Jones, 666 kw.

Indications of the efficient operation are apparent throughout the plant. The floor is neatly painted and rubber mats protect the most used parts, while

TABLE I

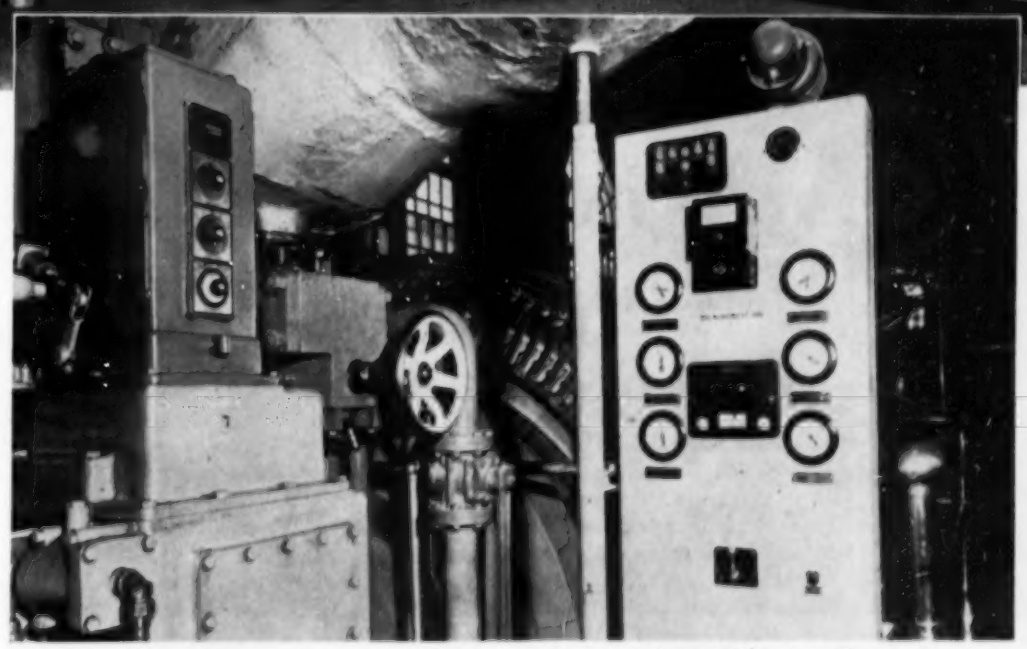
	Kw. Hrs. Generated		Engine Hours		% Time On Line	
Month	3,010 HP	3,600 HP	3,010 HP	3,600 HP	3,010 HP	3,600 HP
Aug. '53	266,000	1,300,000	173	743	23.2	100.0
Sept.	746,000	990,000	490	625	68.2	86.8
Oct.	1,117,000	1,287,000	708	742	95.4	99.8
Nov.	865,000	1,206,000	569	719	79.0	99.8
Dec.	431,000	1,188,000	287	724	38.4	97.5
Jan. '54	796,000	528,000	515	322	69.3	43.3
Feb.	598,000	1,145,000	400	672	59.6	100.0
Mar.	328,000	1,263,000	236	742	31.7	99.8
Apr.	1,004,000	1,237,000	677	718	94.0	99.8
May	1,084,000	766,000	741	450	99.7	60.5
June	910,000	1,154,000	628	711	87.4	98.8
July	1,050,000	1,266,000	725	741	97.5	99.7
TOTAL	9,195,000	13,330,000	6,149	7,909	70.2 Av.	90.4 Av.

many guard rails are brass polished to a high luster. The San Antonio Portland Cement Co. power house is a graphic illustration that good equipment, adequately maintained, and operated with skill in an orderly plant, can produce dependable, low cost power.

List of Equipment

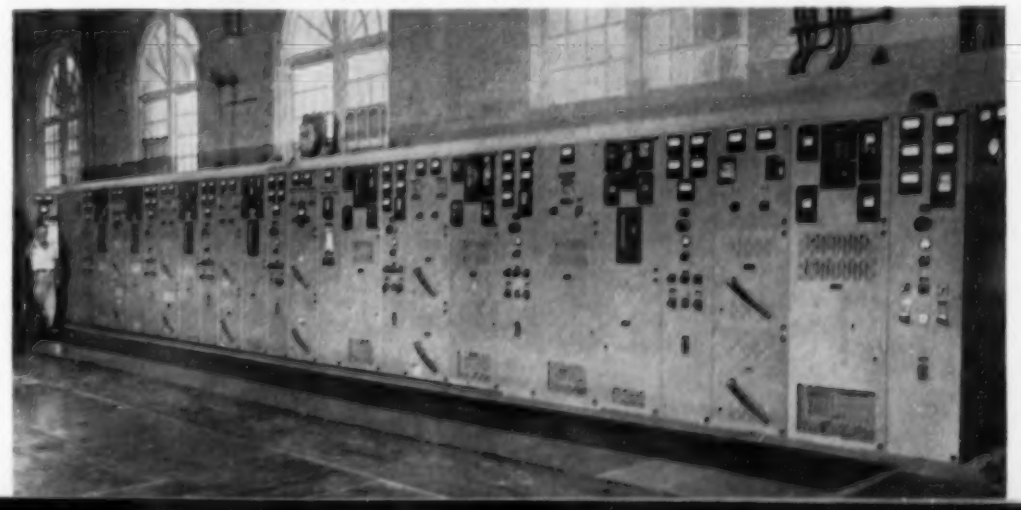
Equipment Serving 3010-hp Nordberg.

Engine—Nordberg duafuel 3010 hp, 21½x31, 225 rpm, 7-cylinder.
Alternator—Westinghouse 3812 kva, 480 volt, 3-phase, 60-cycle alternator with v-belted exciter.
Gas—San Antonio Public Service Board.
Actuator valves—American Bosch.
Gas regulator—Fisher Governor.
Centrifugal separator—DeLaval Steam Turbine.
Fuel filter—Nugent.
Governor—Woodward.
Cylinder lubricators—Manzel.
Lube oil purifier—Houdaille-Hershey.
Auxiliary lube pump—Blackmer.
Lube oil cooler—Graham.
Jacket water pump—Ingersoll-Rand.
Jacket water cooler—Graham.
Cooling tower—Pritchard.
Evaporative air cooler—Marley.
Air filter—American Air Filter.
Scavenging blower—Roots-Connersville.
Air control—Bristol.
Air cooler—Young.
Snubber—Burgess-Manning.
Alarms—Viking Instruments.
Gauges—Lonergan.
Pyrometer—Alnor.
Switchboard—Westinghouse.
Air compressor—Ingersoll-Rand.



Viking alarms, an Alnor pyrometer, Lonergan gauges and the Bristol air controller are included on this compact gauge panel. The Woodward governor is at left.

This is the electrical distribution center for the entire San Antonio Portland Cement Mill. The modern Westinghouse board is equipped with a synchroscope at either end.



Newest Fairbanks-Morse unit is this 2000 hp dual-fuel engine. The Nugent fuel filter, Madison-Kipp cylinder lubricators, and Woodward governor appear in this picture.

LAKE PROVIDENCE, LOUISIANA

FUEL costs at the Lake Providence, La., municipal light plant have been cut to 5.86 mills per kw/hr following the installation of a Fairbanks-Morse dual-fuel engine in 1953. For the six-month period through June 7, 1954, natural gas at 22.5 cents per thousand cu. ft. cost an average of 3.06 mills per kw/hr and pilot oil at 10 cents per gal. cost 0.80 mills per kw/hr. Total power generation was 3,167,000 kw/hrs, 40% of which, or 1,257,000 kw/hrs was generated by the newest engine.

In 1953, a 10-cylinder, Fairbanks-Morse, Model 33 FD 16, dual-fuel engine with a rated output of 2000 hp at 300 rpm, brought the total installed capacity to 4750 hp. The other three units are also Model 33 Fairbanks-Morse engines. The oldest, a 4-cylinder, 600 hp, Style M, has been in service for 22 years, and is the only straight oil engine left.

For the 6-month period cited, fuel oil consumption for the entire plant averaged 0.00796 gallons per kw/hr which included 235,000 kw generated by the 600 hp oil engine (about 7.8% of the total) while the new 2000 hp engine required a meager 0.00575 gallons per kw/hr during the same six months. Naturally, a reduction in the consumption of the more expensive liquid fuel results in a reduction in overall plant operating costs. The large engine is inherently the most efficient in the plant. Pilot oil cost for this unit is just 0.58 mills per kw/hr. Because the three gas-burning engines are served by a common meter, the improvement in gas consumption achieved by the new engine cannot be precisely reported, although recognized.

Prior to the installation of the dual-fuel engines, the veteran diesels, ranging from 9 to 17 years old, averaged about 12 kw/hr per gallon of fuel. At the current fuel cost of 10 cents per gallon, this meant 8.33 mills per kw/hr compared to the 5.98 mills per kw/hr realized with the dual fuels, a saving of 4.35 mills per kw/hr. For the 3,167,000 kw generated in the six-month period previously discussed, a saving of more than $13,000 was realized by using natural gas as the principal fuel.

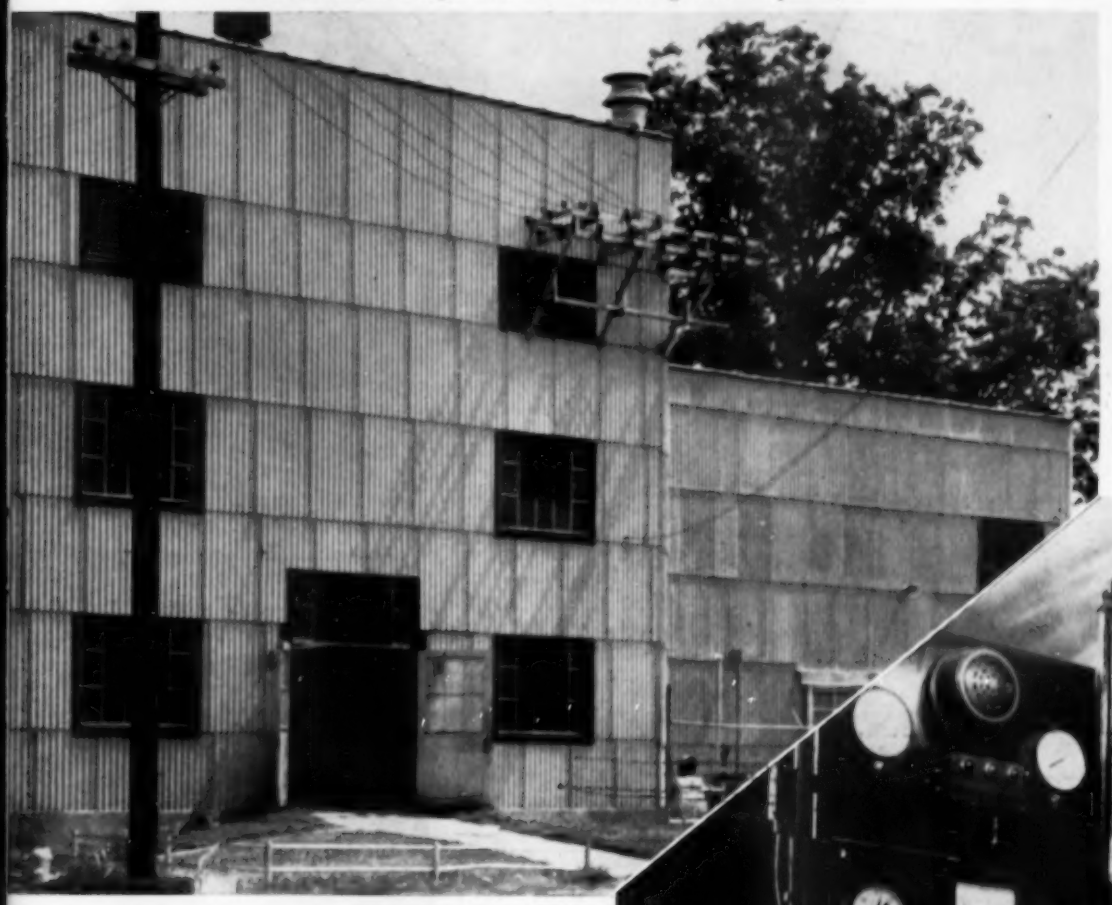
Lake Providence is located in the heart of the rich farm land along the Mississippi River. With a population of 4125 in 1950, the chief electrical load is residential and has been steadily increasing with the wider use of home appliances, especially air conditioning units. In 1954, the peak load reached 2175 kw in August when the six local cotton gins started ginning. Two gins are entirely powered with electricity while the other four use electricity to a lesser degree. Other big users of electricity are the resorts along nearby Lake Providence and the extensive rural lines served.

Pete Keyes, plant superintendent, is sure that H. W. Blount, chief operator, is familiar with all of the engines in the plant because he has been on the job 35 years. In 1919 when Mr. Blount started, two Corliss steam engines and a 100 hp Fairbanks-Morse oil engine provided the 250 hp capacity. Two years later, the steam equipment was removed and another 100 hp oil engine was installed. In 1923 the first oil engine was superseded by a 200 hp engine. This was soon followed by a 360 hp engine. The first Model 33 Fairbanks-Morse diesel replaced the remaining 100 hp unit in 1932. Just before the second World War, a 750 hp Model 33 joined the 600 hp engine and replaced the 17-year-old oil engine.

TABLE I

Time	2000 Hp.	Plant	Total Gal. Fuel Oil	Total MCF Gas	Fuel Cost Per Kw/Hr (Mills) Gas	Oil	Total
Dec. 6—Jan. 5	254,000	547,000	5,490	6,847	2.81	1.01	3.82
Jan. 6—Feb. 6	98,000	542,000	4,130	7,959	3.30	0.76	4.06
Feb. 7—Mar. 5	25,000	430,000	3,650	5,968	3.13	0.85	3.98
Mar. 6—Apr. 5	177,000	506,000	3,940	6,505	2.89	0.78	3.67
Apr. 6—May 5	320,000	536,000	3,640	7,067	2.97	0.68	3.65
May 6—Jun. 7	383,000	606,000	4,360	8,761	3.25	0.72	3.97
Total	1,257,000	3,167,000	25,210	43,107	3.06	0.80	3.86

This Louisiana municipal plant has a total capacity of 4750 hp, developed by four Fairbanks-Morse Model 33 engines. Plant fuel costs average 3.86 mills per kw/hr.



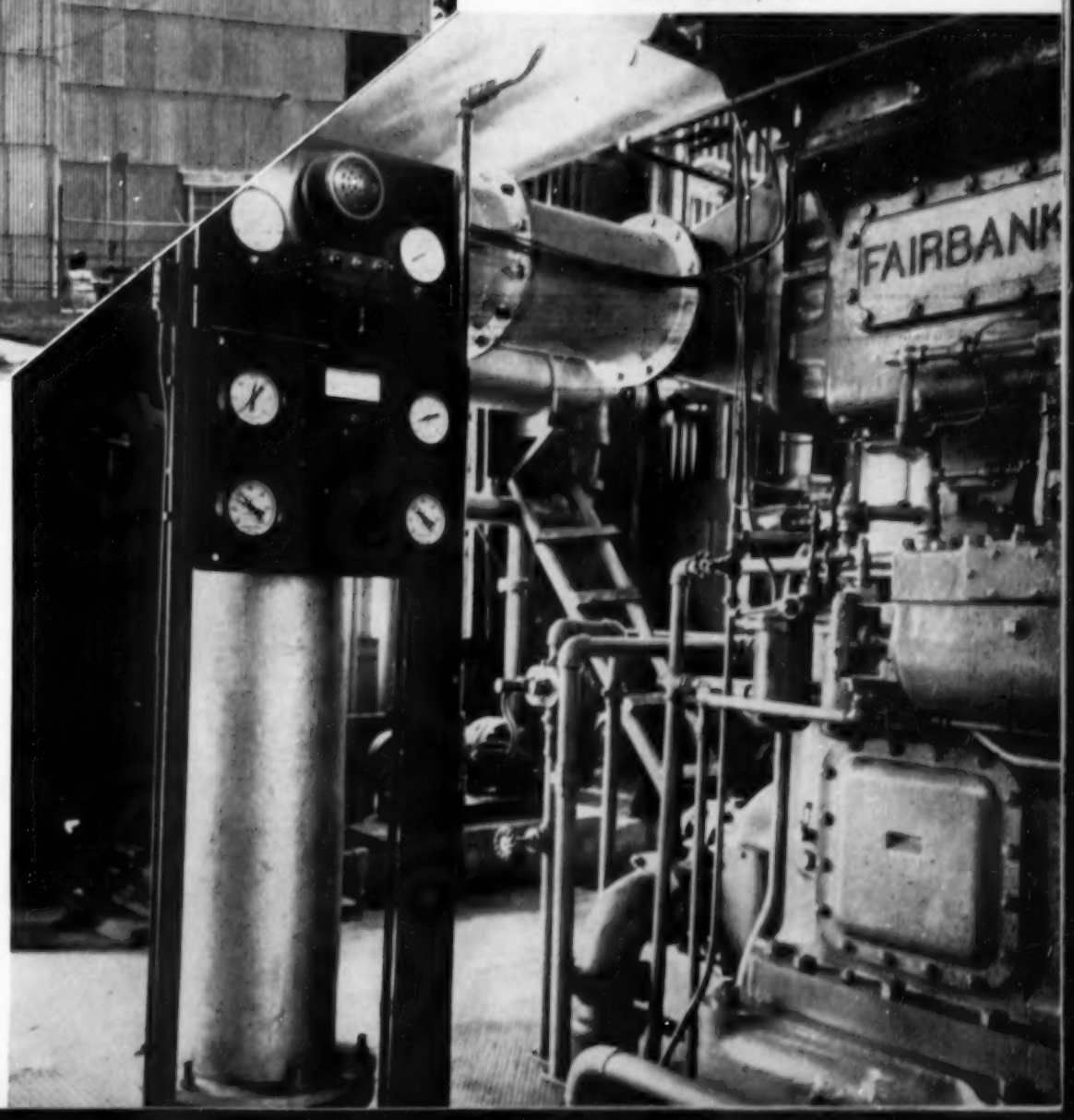
In 1949, the 1400 hp dual-fuel was added to the plant. Finally, the last of the engines purchased in the 1920 decade was replaced by the big 2000 hp Model 33. After nearly 20 years of reliable service, this 360 hp Fairbanks-Morse engine was sold for service in a Central American country. Also, at that time the 13-year old, 750 hp engine was converted to dual-fuel operation.

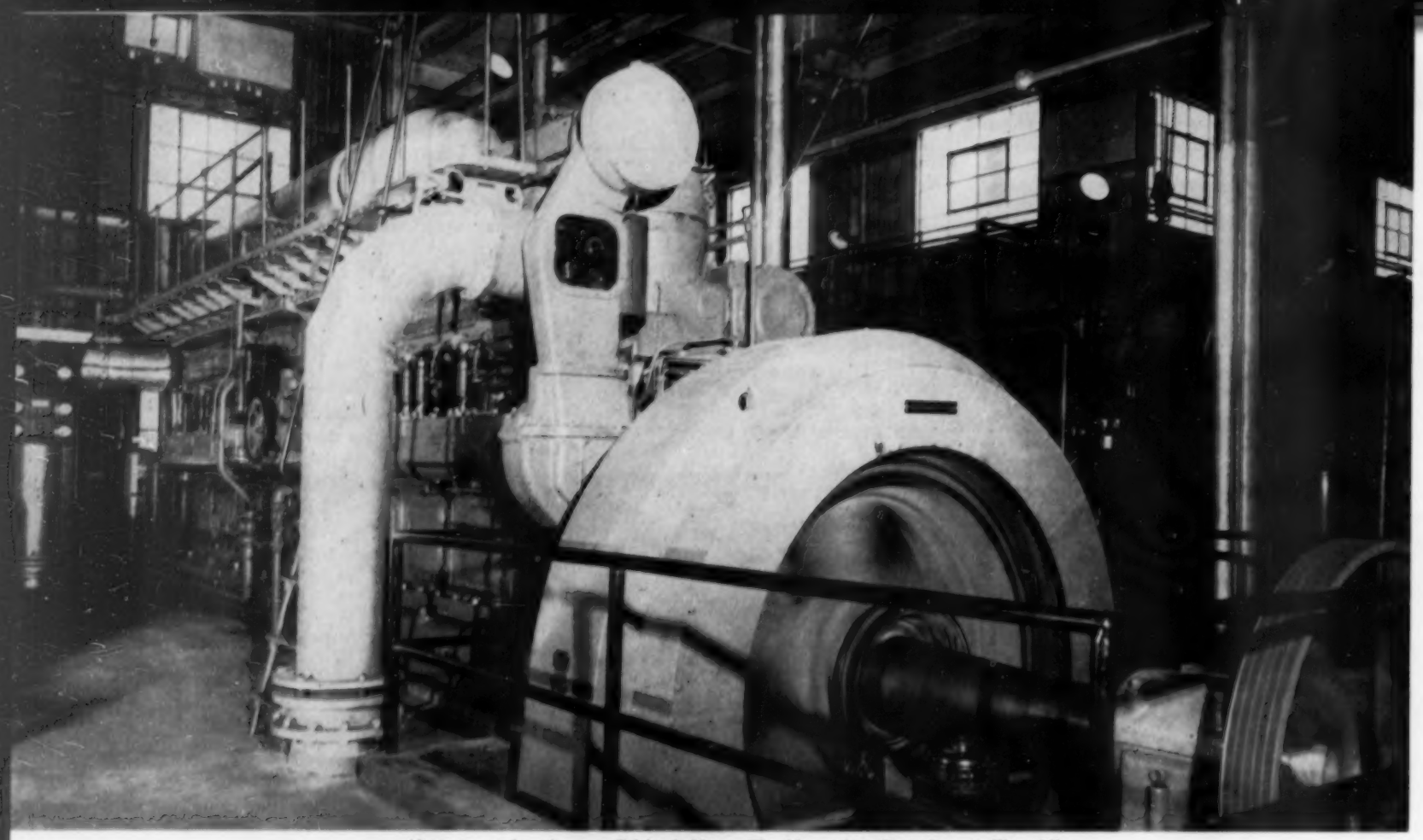
The fuel induction system is standard except for the elimination of a large day tank. The gas enters the cylinders through the cam-operated admission valves after the scavenging blower has provided a full charge of air. Gas pressure on the header is controlled by the governor. Pilot fuel passes through a filter and is delivered to the injection pumps by the engine-driven fuel pumps. In case of gas interruption, the engine switches automatically to full diesel operation. This is the only engine in the plant with a motor-driven blower for scavenging. Located in a small structure outside the plant, the blower motor is wired directly to the alternator. This means that when the alternator is turning, the blower motor must also be on the line. When starting the engine, a small motor-generator set is used to energize the field of the alternator so that the blower motor will receive power and start to deliver air for combustion. As soon as the belt-driven exciter reaches its correct output, the motor-generator set automatically drops out of service.

Intake air passes through an impingement type air filter located atop the blower house. In normal service, the screens are washed with diesel fuel once each week. A manually-operated damper in the scavenging air line after the blower is used to set the correct air rate to the engine. Operators observe the exhaust temperature to determine the proper damper setting. For the usual operating load, scavenging air pressure at the engine is about 1 psig. An exhaust snubber is also located on the roof of the blower house.

An induced draft cooling tower provides cooling for the oil and jacket water coolers. Fairbanks-Morse centrifugal pumps deliver the water from the tower, which serves the 750 hp engine as well, through the heat exchangers in series. The oil cooler is first in line. Another motor-driven F-M centrifugal pump circulates the engine jacket

Viking alarms and an Alnor pyrometer are included on the gauge board. Thermostatic valves in the system were manufactured by Amot.





Alternator and exciter are Fairbanks-Morse. The blower is a Roots-Connersville, while both the air filter and exhaust snubber are Burgess-Manning.

TABLE II

Prime Movers

Engine	Horse power	No. of Cylinders	Speed Rpm	Fuel	Year Installed
Fairbanks-Morse Model 33 FD 16	2,000	10	300	Dual Fuel	1953
Fairbanks-Morse Model 33 FD 16	1400	7	300	Dual Fuel	1949
Fairbanks-Morse Model 33 FD 16	750	5	257	Fuel*	1940
Fairbanks-Morse Model 33, Style M	600	4	257	Diesel	1932

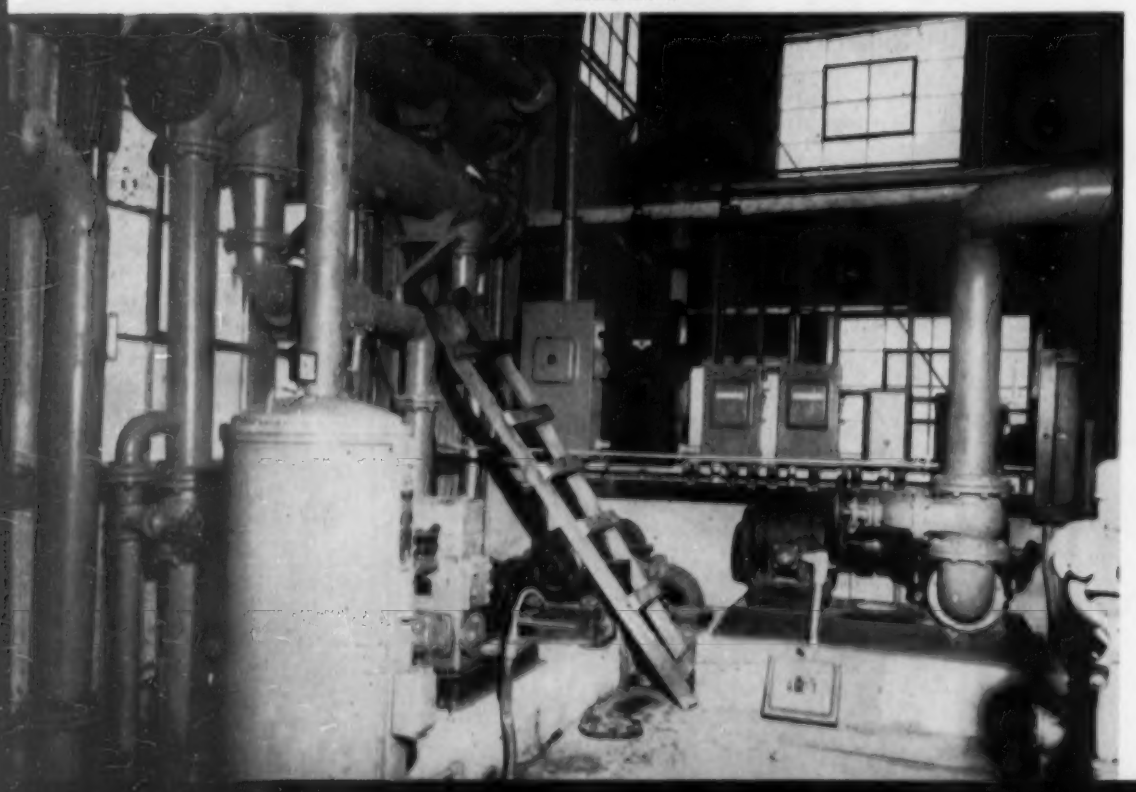
*Converted to dual fuel, 1953

water in the closed system. Straight mineral oil is circulated through the strainer, heat exchanger, and into the big engine's lubricating passages by an engine-driven pump. A fuller's earth cartridge is used in the oil purifier, which is of the by-pass type. An auxiliary pump for before and after operation is available also for emergency service.

Alarms for lube oil pressure and cooling water temperature are included on the engine gauge panel. Essential gauges for air, oil and water pressures and the exhaust pyrometer complete the instrumentation. This panel is located at one end of the engine where the heat exchangers, air control, oil filters, and pumps are conveniently grouped. Power generation by the Fairbanks-Morse, 1875 kva, 1400 kw, alternator is at 2400 volts.

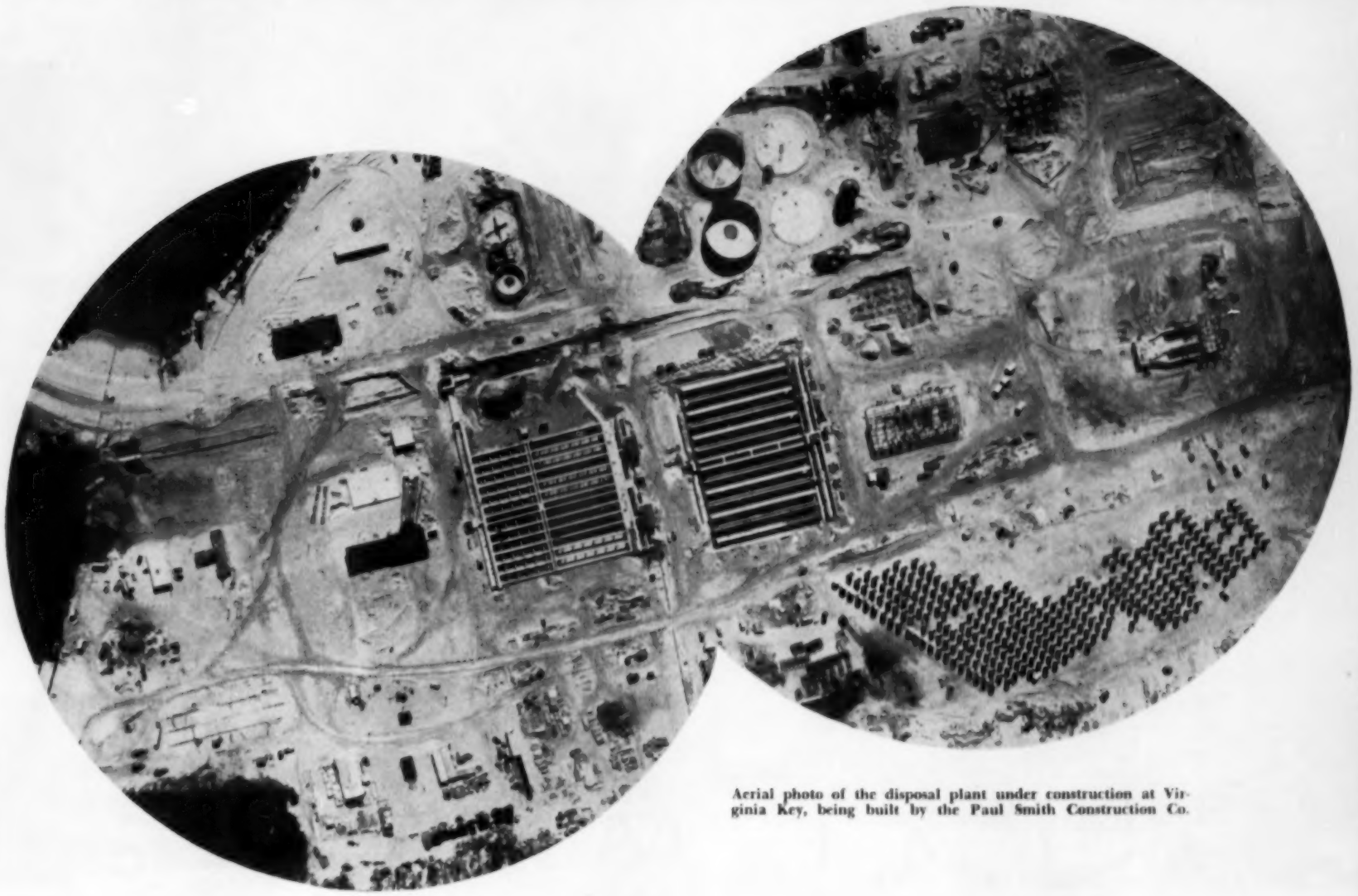
The townspeople in Lake Providence are justly proud of their power plant, of its growth and improvement. It has consistently provided sound service at moderate rates. With the change to natural gas, electric rates have remained low in an era of generally rising costs while the city, under the leadership of Mayor W. B. Cone, has experienced continued profits from the sale of electricity.

The Ross heat exchangers and the Honan-Crane oil purifier are located in a group for convenient operation. Jacket water pump for the newest engine is a F-M centrifugal with motor drive.



List of Equipment

Engine—Fairbanks-Morse 2000 hp, 16x20, Model 33FD16, 300 rpm, dual-fuel.
Alternator—Fairbanks-Morse 1875 kva, 1400 kw, 2400-v, 3-phase, 60-cycle alternator with v-belted exciter.
Motor generator set—Fairbanks-Morse.
Gas—Louisiana Light and Power Co.
Fuel filter—Nugent.
Fuel oil—Simmons Oil and Refining Co.
Governor—Woodward.
Lube oil—Sinclair.
Lube oil purifier—Honan-Crane.
Lube oil strainer—Purolator.
Auxiliary lube pump—Roper.
Cylinder lubricators—Madison-Kipp.
Cooling tower—Burks.
Heat exchangers—Kewanee-Ross.
Blower—Roots-Connersville.
Air filter—Burgess-Manning.
Exhaust snubber—Burgess-Manning.
Alarms—Viking.
Pyrometer—Alnor Inc.
Thermostatic valves—Amot.



Aerial photo of the disposal plant under construction at Virginia Key, being built by the Paul Smith Construction Co.

MIAMI SOLVES ITS SEWAGE PROBLEM

By ED DENNIS

POLLUTION of South Flordia's beaches and bays became an increasingly serious problem until the City Fathers of Miami, with the approval of the voters, decided to do something about it. In 1951 a $27,100,000 bond issue was voted to build an adequate sewer system. Today, the sewage is being emptied into Biscayne Bay and the Miami River but sometime in 1956 it will be pumped across Biscayne Bay to the new sewage treatment plant being built on Virginia Key. After treatment there, it will be pumped 4800 feet out to sea and discharged 17 feet below the surface.

The Miami City Council laughed 25 years ago when Herbert L. Schaller, then the city plumbing inspector, asked for an 8-in. pipe to carry sewage across the heart of the city. Now, they are putting in 72-in. sewer mains in some sections of the city.

The big mains being laid are an intercepter system that stretches along the Miami River and the edge Biscayne Bay. The mains will be joined with the existing city sewer system outlets. Instead of being discharged into the river and bay, the sewage will be pumped 14,353 ft. underwater to Virginia Key where the new treatment plant is being built.

The Paul Smith Co. has the $9,216,559 contract for the treatment plant which will turn the sewage into sludge. This will be incinerated and the residue, a clean fluid, will be discharged into the ocean almost a mile from shore. Municipal Service of Kansas City, Mo. has the sub-contract for the installation of the plant's machinery which amounts to $2,400,000 and will include five Worthington dual-fuel engines on Worthington pumps.

Virginia Key was a mangrove wilderness when the work started back in 1953. It took three weeks of manual labor to chop a two-mile path through the swamp plus almost four days to navigate the first dragline over the same two miles. Before the treatment plant is finished, 40,000 cu. yds. of concrete will have been poured, 15,000 piles driven into the soggy earth, and over 4,000,000 pounds of reinforcing steel used.

Construction of a sewer system in Miami presents unusual problems. Most of the city is only a few feet above sea level. The result is that there is constant seepage of water through the porous oolite rock into many of the ditches being dug. Work however proceeded on schedule.

Along Biscayne blvd. in the city of 250,000 population, 72-in. and 60-in. concrete pipe was laid at the rate of a block a week. That included ditching through oolite rock, laying the pipe, back filling and paving the street.

The use of Moretrench vacuum pumps and well points kept the trenches dry and made it possible to keep on schedule. These 1¼ inch well points

Looking across Biscayne Bay from Bayfront Park towards Virginia Key. The laying of this section of pipe in the bay was awarded to Merrit, Chapman & Scott. Note the two pieces of dieselized equipment.

A 2½ yd., GM dieselized, Lima crane owned by the Lew Corp., working on Virginia Key.

were driven into the rock at 3-foot intervals and joined a common 10-inch header line. The Moretrench vacuum pumps are powered by General Motors series 71 diesels. The ditch dewatering system usually has 40 or 50 well points on each side of the ditch and has proved very successful in this type of operation.

It was estimated that three years would be required to complete the $27,100,000 project which included the laying of 16 miles of concrete pipe ranging up to 72 in. in diameter. But due to the tremendous amount of dieselized equipment being used, the overall project was six months ahead of schedule at the beginning of 1955.

The intercepters (mains) are designed to handle the anticipated sewage flow expected until 1980 when it is estimated that the population of Miami may reach 453,000. The treatment plant will be able to handle 47,000,000 gallons of sewage a day. This plant can be expanded to 68,000,000 gallons daily for the 1980 population quite easily. Provisions for equipment installation have been made in

Bayfront Park on Biscayne Blvd. A Bucyrus-Erie crane is driving sheeting into the soft sand, on the right is a Drott skid shovel powered with a TD 6 International diesel. Note the 1¼-in. well points and the 10-in. headers.

Another 3-71 General Motors powered vacuum pump located at Pier #3 in Miami, which will be the location of one of the main pumping stations. In the foreground are several "well points."

General Motors diesel with a GM power take-off and a Moretrench vacuum pump. This is one of about a dozen pumping units that have been pumping continuously for about a year without a let-up, on Virginia Key.

the first construction phase and area for additional treatment units has been provided.

The need for dependability is obvious since waste disposal is a 24-hour-a-day, year-round job. Interruptions would be dangerous to the health of the community. Therefore for emergencies, each of the two main pumping stations will have for standby use three model 38F5¼ Fairbanks-Morse diesel engines rated at 450 hp and five 20x24 inch Fairbanks-Morse pumps. Three of the pumps will have dual diesel engine and electric motor drives. The other two pumps will be driven by Fairbanks-Morse 350 hp electric motors. The De Fonce Construction Co. has a $2,454,160 contract which calls for the construction of six pumping stations.

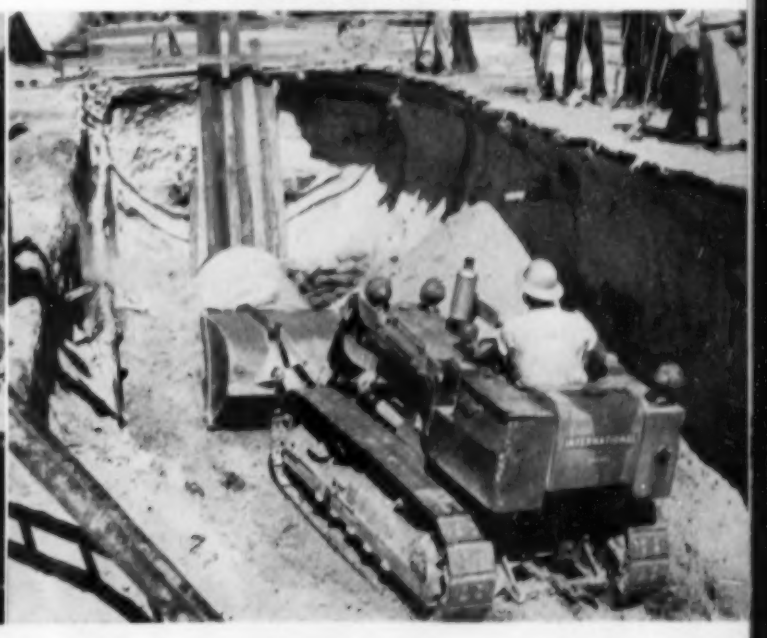
One acute problem in building a main pumping station along the Miami River was the excavation of rock to the depth of 30 feet below the surface of the river with only steel sheathing and sand bags for a dike. Fifteen General Motors series 71 diesels are keeping the "big hole" dry for the workmen and engineers. These are 3-, 4- and 6-cylinder engines, coupled to Moretrench vacuum pumps.

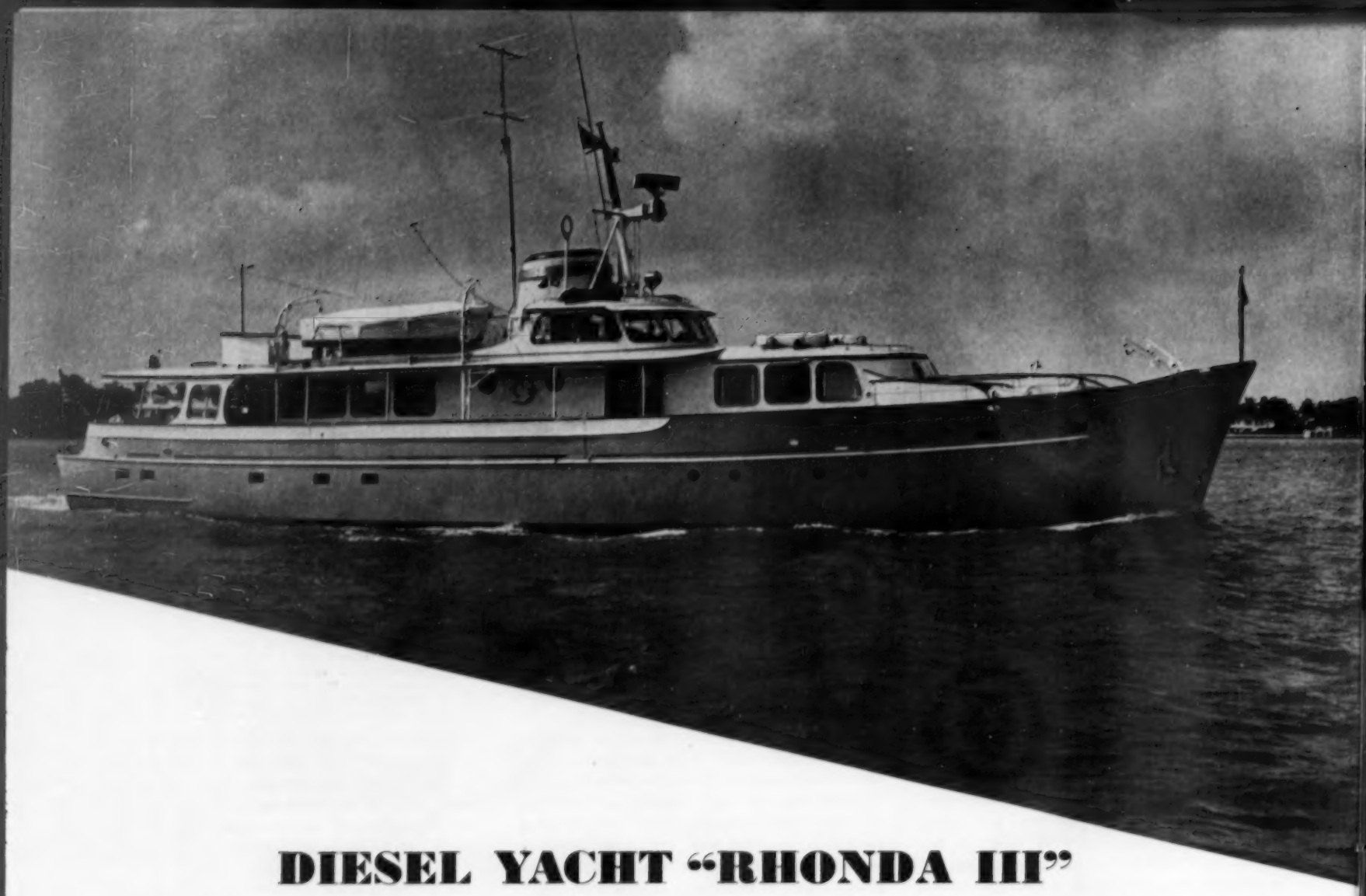
Merritt-Chapman & Scott holds the contract for 14,353-ft. underwater span across the bay. The 32-ft. sections of reinforced concrete pipe were manufactured in 16-ft. lengths by Price Bros. The two lengths were joined at the contractor's local plant and hauled to the dock where they were loaded onto barges and towed by dieselized tugs to the derricks in the bay. The sections were lowered onto a crushed stone bed. The 40-man crew of divers, engineers and dredgemen averaged laying about 195 ft. of the line a day. When the pipe laying job was finished, the trench was backfilled and the line tested before proceeding.

The project is under the direction of William A. Glass, director of the Department of Water and Sewers. Connell & Rader Associates of Miami are supervising contracts No. 1, No. 2, and No. 3 which are the intercepters and force mains, the pumping stations and the line across Biscayne Bay. Metcalf & Eddy of Boston are supervising contracts No. 4 and No. 5, for the treatment plant on Virginia Key and the outfall to the ocean.

W. T. Price Dredging Co. and Blythe Bros. who hold the prime contract, had several of these Hough Payloaders on the job powered with an 86 hp Hercules diesel engine and an Allison torque converter.

A TD 6 International Harvester diesel tractor being used to back fill over a section of pipe. This is one of the few sections where the contractors ran into sand. Most of the ditches were dug in oolite rock.





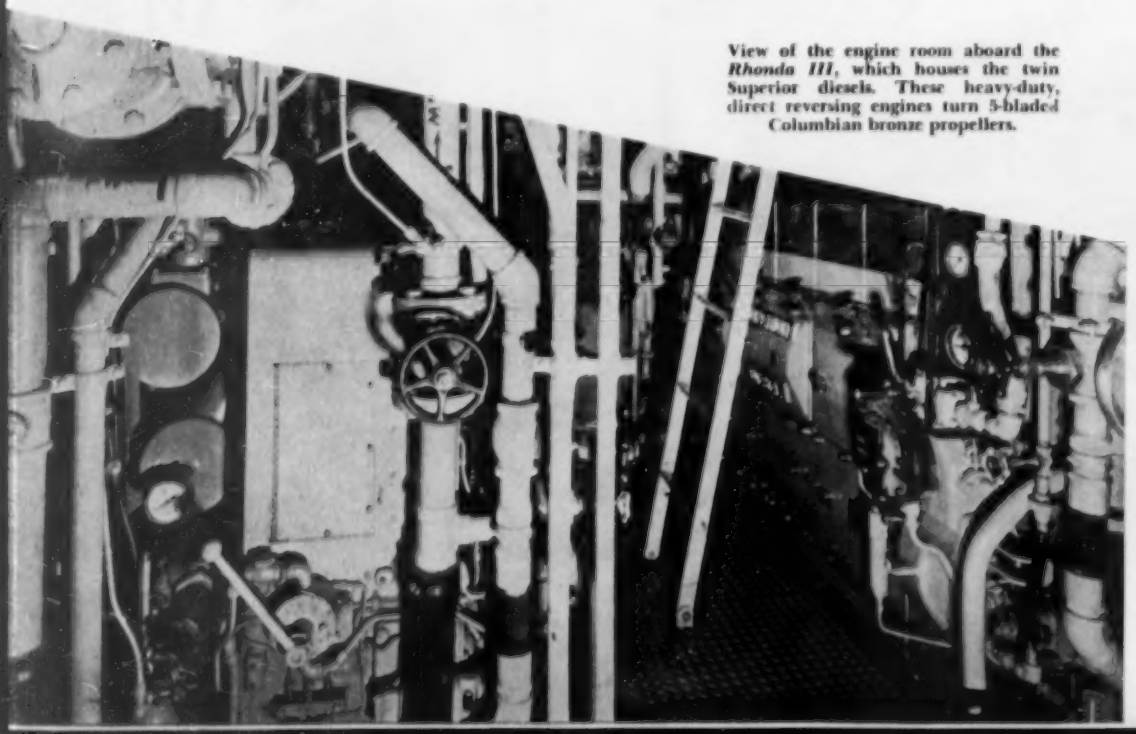
DIESEL YACHT "RHONDA III"

By SIDNEY HOFFMAN

THE *Rhonda III*, asserted to be the largest yacht built by any shipyard in 1954, also measures up to being one of the finest. Designed by M. Rosenblatt & Son, naval architects and marine engineers of New York City, the vessel was built by Ingalls Shipbuilding Corp., Birmingham, Ala., for their own account.

The craft represents the ultimate in luxurious living afloat. The long, smooth sweep of its lines make it appear longer than its 95-ft. 10-in. length.

She has an extreme molded beam of 20 ft. 10 in. and draws 5 ft. 7 in. with a half load, amidships. From her keel up to the top of her mast, the



View of the engine room aboard the *Rhonda III*, which houses the twin Superior diesels. These heavy-duty, direct reversing engines turn 5-bladed Columbian bronze propellers.

Rhonda III possesses all the features required for a sturdy, dependable, sea-going vessel with all the comfort, convenience and privacy that could be desired. She is a handsome ship, exhibiting the designer's characteristic blend of modern and traditional design and the builder's fine craftmanship. Uncluttered space and plenty of headroom have made her very much talked about by yachtsmen.

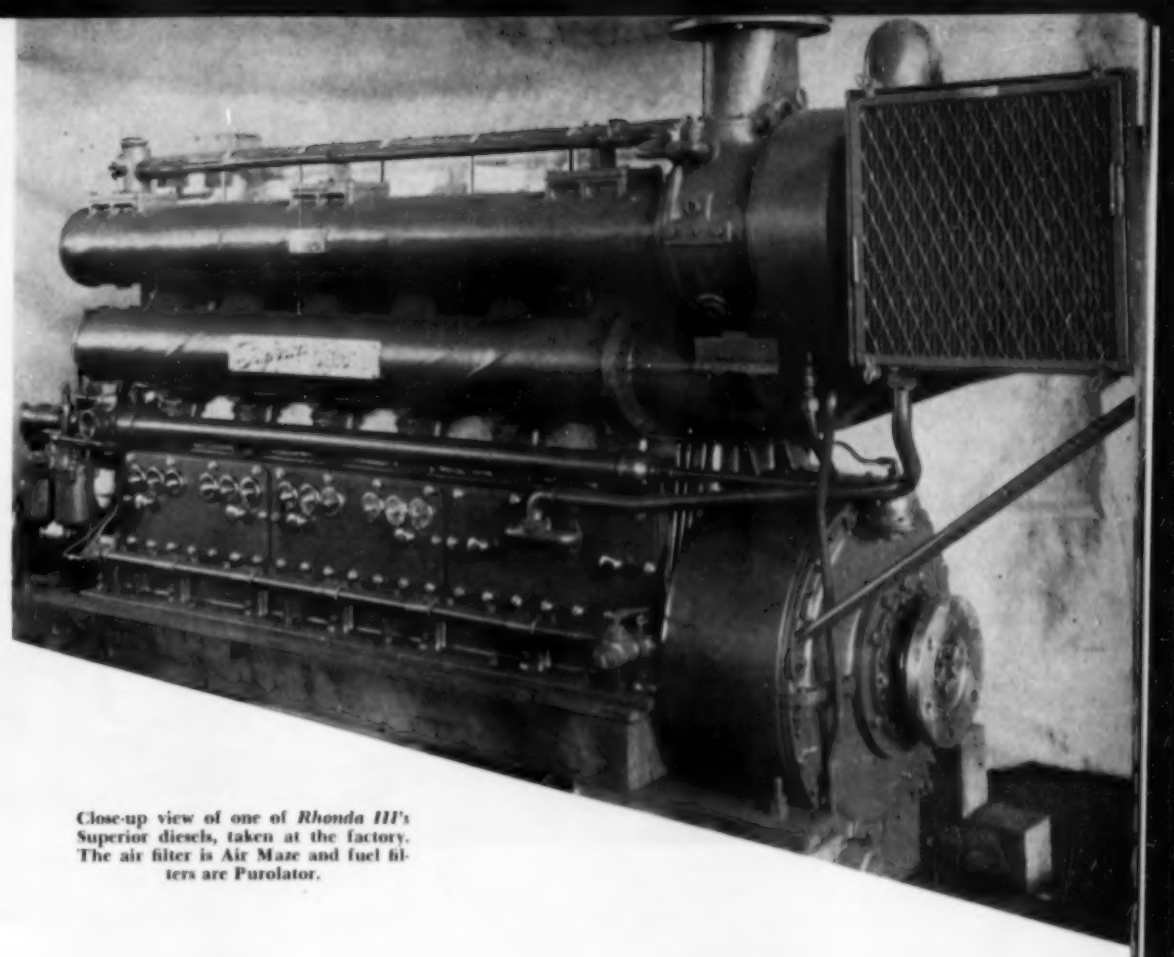
Since being placed in service earlier this year, the *Rhonda III* has more than met her designer's and builder's expectations. Her main propulsion machinery, two Superior, 4-stroke cycle, Model 40-M3X-6 turbocharged diesels deliver smooth, dependable power to her two 44-in. by 34-in. propellers. Each of the engines is a direct reversing, 6-cylinder unit with 8½-in. bore and 10½-in. stroke. They deliver their rated 426 brake horsepower at 650 rpm continuous and 490 bhp at 683 rpm at the 15% overload, 2-hour rating.

Equipment includes fresh and salt water pumps, lubricating oil pressure and lubricating oil scavenge pumps, and Ross-type CP jacket water and lubricating oil coolers. The Maxim exhaust silencers are located in the upper casing and stack. The main machinery is started and reversed with a conven-

tional air system. Compressed air is supplied by two Quincy air compressors. The main engine controls are twin Morse single lever systems that can be operated from either the pilot house or engine room.

An ac electric system was originally specified for auxiliary purposes, since this permits the use of lighter equipment and also makes for fewer maintenance problems. However, yacht service requires almost silent operation during the night when tied up to a dock or moored in a yacht basin. The continuous operation of the ac system could not be tolerated. The electric generating plant finally decided upon consists of two 30 kw diesel generator sets in conjuction with storage batteries. The plant consists of two 6-cylinder Lister model FR6 diesels coupled to Fairbanks-Morse 30 kw, 120 volt dc generators. The engines are rated 37.5 brake horsepower at 1200 rpm for continuous operation. When the generating sets are secured, 30 trays of 2-cell Exide Ironclad batteries carry the load. The 8220-pound battery bank is rated 768 ampere at the 8-hour rate and 804 ampere hours at the 10-hour rate. The ac electrical power is supplied by two 7½ hp, 4 kw motor-generator sets.

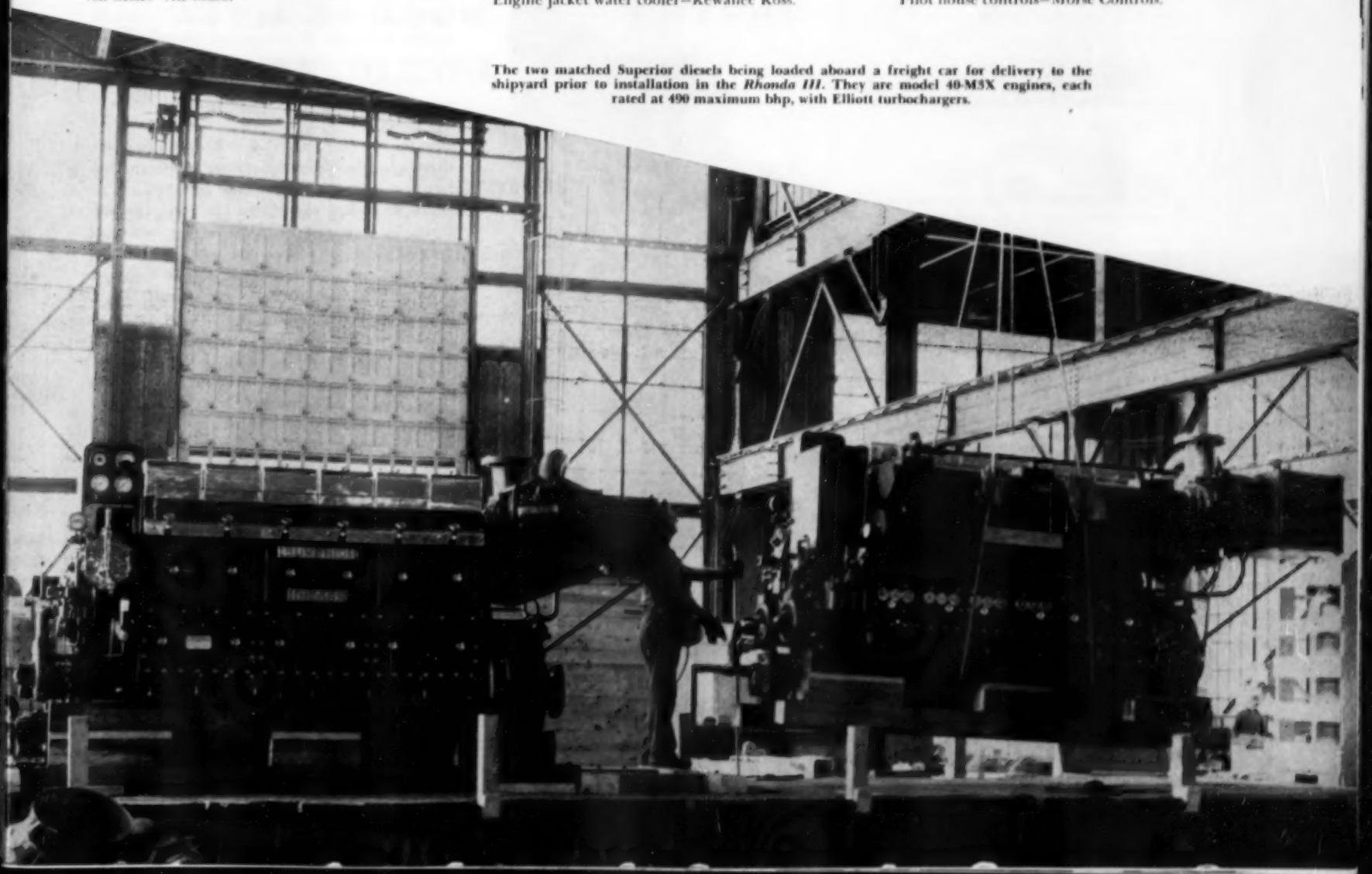
The *Rhonda III* has a maximum speed of 14 knots, a sustained cruising speed of about 12½ knots and has a cruising range of 2500 miles.



Close-up view of one of *Rhonda III*'s Superior diesels, taken at the factory. The air filter is Air Maze and fuel filters are Purolator.

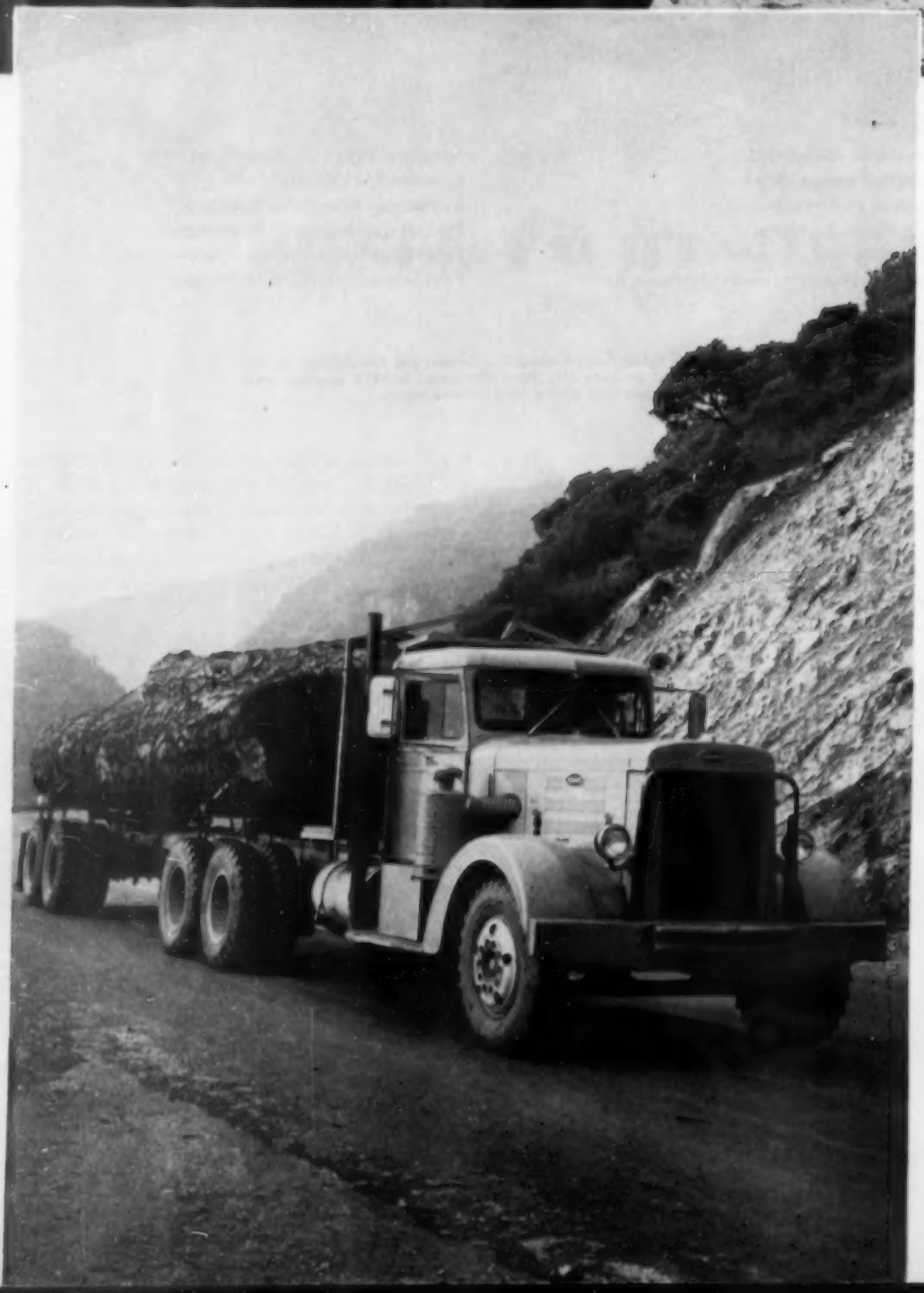
List of Equipment

Main engines—2 Superior 40-M3X-6 rated 426 hp each at 650 rpm, continuous.
Turbochargers—Elliott.
Intercoolers—Trane.
Air filters—Air Maze.
Governors—Woodward.
Injection pumps—Bosch.
Exhaust silencers—Maxim.
Fuel filters—Purolator.
Lube oil cooler—Kewanee Ross.
Engine jacket water cooler—Kewanee Ross.
Auxiliary engines—2 Lister model FR6.
Generators—Fairbanks-Morse.
Aux. engine lube filters—Purolator.
Fuel oil transfer pump—Worthington.
Fresh water transfer pump—Worthington.
Pilot house controls—Morse Controls.



The two matched Superior diesels being loaded aboard a freight car for delivery to the shipyard prior to installation in the *Rhonda III*. They are model 40-M3X engines, each rated at 490 maximum bhp, with Elliott turbochargers.

Coming down from mountain forests on tortuous roads, truck pedal-braking is practically eliminated for Big Bear timber drivers because of the built-in braking features of their torque converters which lock driving wheels to turbine through a special free-wheel.



EARLY in 1954 the Big Bear Timber Co., Redlands, Calif., producers of Ponderosa and Jeffrey pine lumber, started a unique dieselized logging operation. It has proved profitable, and, at the same time, has made a distinct contribution to the preservation of one of America's most important natural resources: our national forests.

Logs for Big Bear's new mill at Redlands come entirely from the national forests of Southern California, prized chiefly as wildlife preserves, recreational areas, and watersheds. Big Bear is participating in a conservation program that consists of keeping the forests clear of fire- and insect-ravaged trees that seriously weaken the forests. Existence of such trees makes the forest increasingly vulnerable to fire hazards and to the tiny but voracious bark beetles that usually single out the older and larger trees for attack.

These two enemies long have been the scourge of the Forest Service. Foresters have tried many ways to control these two deadly forest threats. While fires—caused by man and lightning—have yet to be conquered, an effective way of dealing with the bark beetle has been found. This method consists of cutting down and hauling away the bark beetle's favorite food and breeding places . . . namely, the older pine trees. The harvested trees are then replaced through a scientific replanting program that eventually brings new life to burned-out, insect-ravaged timberlands. The younger trees, being resistant to the bark beetle plague, are left standing.

In the process of helping preserve forests, Big Bear Timber Co. finds itself in possession of a supply of

Unloading at the Big Bear mill near Redlands, Calif. Cummins-powered trucks are making faster round trips due to Twin Disc torque converters which provide special lock-out drive for flat terrain.

TIMBER SALVAGE PROFITABLE WITH TORQUE CONVERTERS ON DIESEL TRUCKS

raw material limited only by its ability to haul salvagable logs out of the San Bernardino National Forests, 40 to 65 miles east and north of Redland. Big Bear's main problem in launching this profitable, forest-saving operation was in finding transportation equipment that would haul enough logs —over relatively long distances—to satisfy the hunger of a highly modern mill, with a capacity of from 90,000 to 100,000 bd. ft. per day. The problem was further complicated by the fact that the equipment had to have the versatility to make top legal road speeds over the highway with 40,000 lb. payloads . . . and yet have the stamina needed to reach a loader several miles back in the woods and take the steep grades on the way.

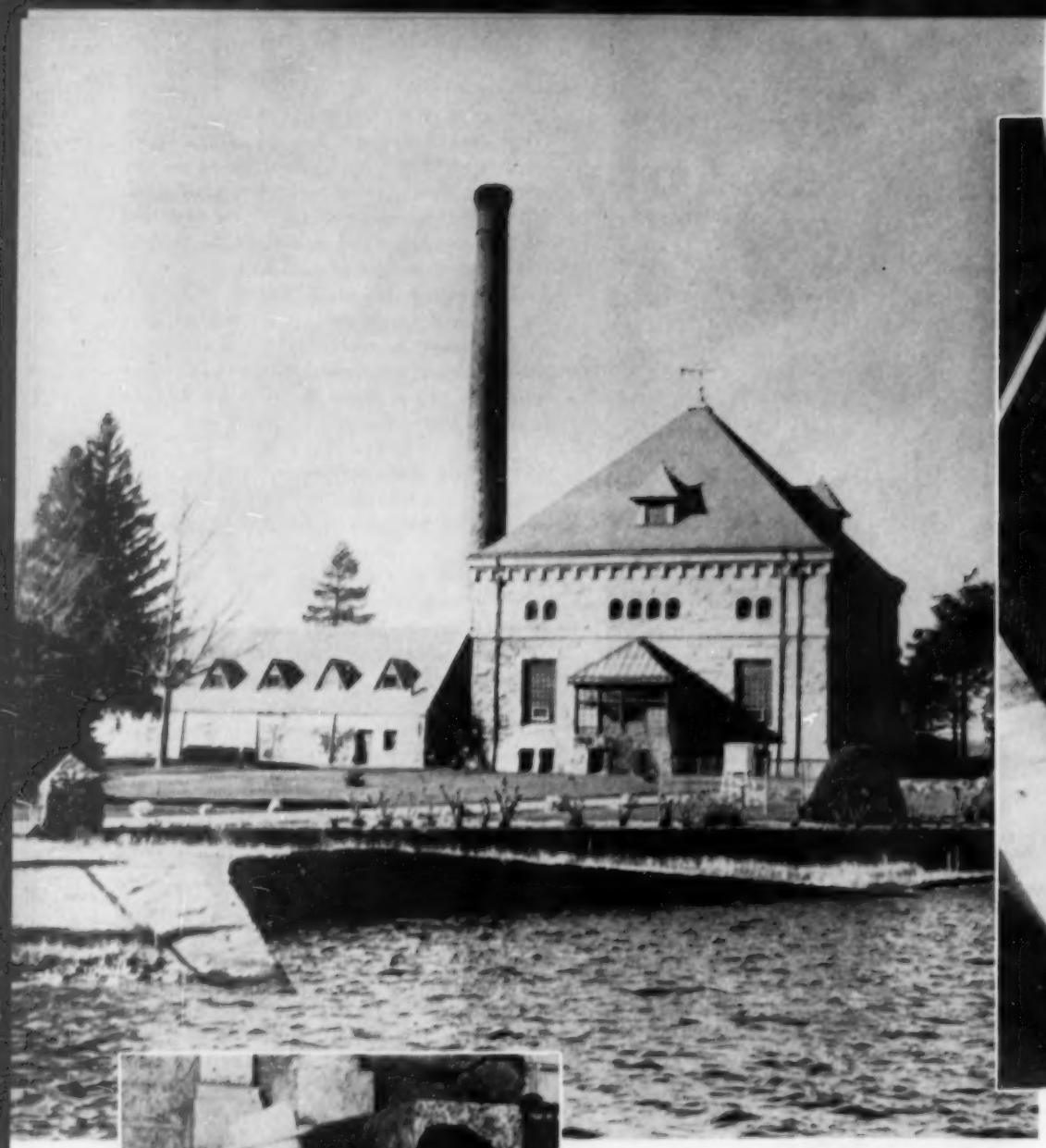
To handle this kind of rugged double-duty safely and economically, Big Bear's president, Dave Rogers, finally settled on four new Peterbilt Model 350 logging trucks, powered by Cummins 275 hp diesels working through Twin Disc Model DF truck-type torque converters. The diesel engines provided a dependable power source for any extreme of load requirement encountered on the job. The performance of the diesel and torque converter-equipped Peterbilts has been so satisfactory that Big Bear has placed an order for three more.

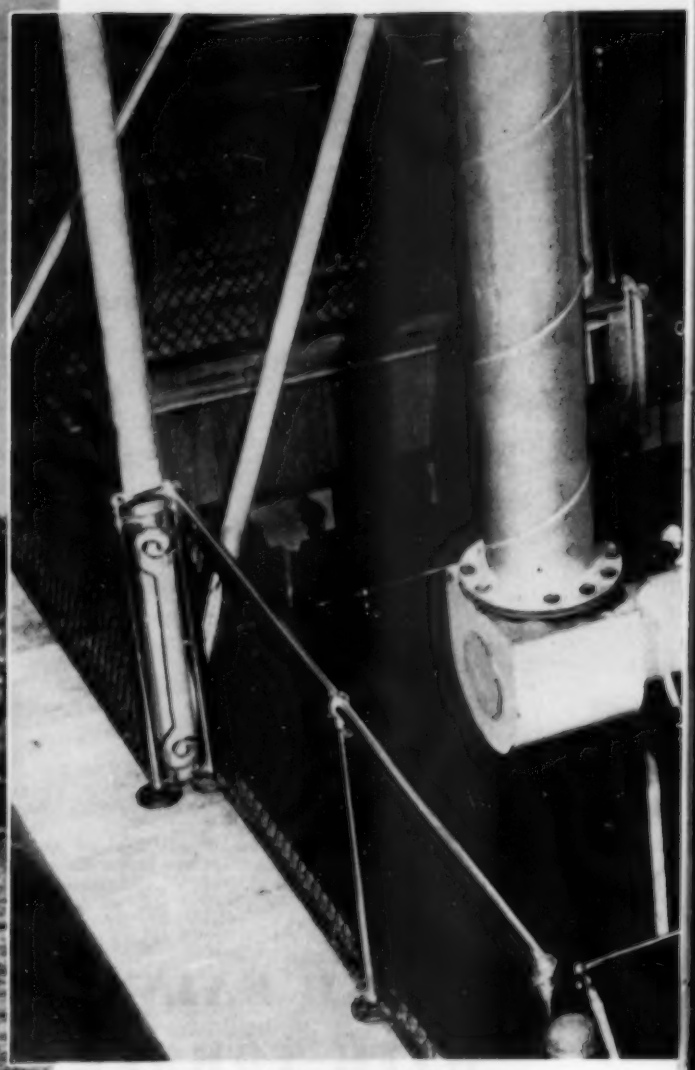
Commenting on the advantages of torque converter-equipped diesel trucks, President Rogers states: "On 16% and 17% adverse grades, the torque converters ease right out. On one 25% adverse grade, our torque converter-equipped trucks were the only ones that could pull the hill. We had several trucks with standard transmissions that spun out on the turns and chewed up the tires. We're definitely saving money on the tires, engines, and drive line components because of the torque converter's ability to deliver us plenty of power exactly when we need it, and to absorb shocks before they can do any damage to the rig."

With the high utility ratio of the Twin Disc 3-stage design—built-in hydrodynamic braking—and lock-out drive for long, flat stretches, the torque converters also are proving real time-savers for Big Bear. Drivers are making the 45-mile round trip out of Stetson Creek in three hours, including loading and dumping. Driver Ray Painter puts it this way: "Driving torque converter transmission trucks is an 'easy-man's job.' I only shift twice from the time I leave the dump until I get to the loader. With a standard transmission, a man will shift continuously on the grades. All summer we were operating over at Barton Flats. That's a 65-mile round trip haul. Grades were really rugged over there. They were up to 30% and better sometimes . . . so bad that some of the trucks had to be helped up and down part of the time with a tractor. But the torque converter diesels really did a job of climbing those steep, adverse grades."

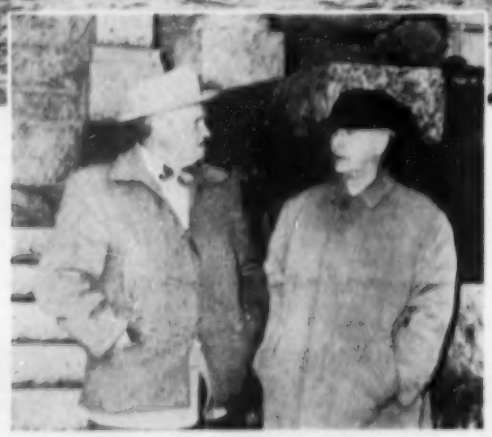
To clinch the case for torque converters in Big Bear's log-hauling trucks, it should be added that Big Bear management has already ordered three more Peterbilts—equipped identically to the first four. Big Bear's experience with torque converters is similar to that of hundreds of operators throughout the logging industry. Modern diesels—working through torque converter drives—are proving to be the most economical answer to high-speed, dependable log hauling over adverse terrain.

Aided by torque multiplication of a Twin Disc torque converter, a Big Bear Timber Co. Model 350 Peterbilt pulls a load of logs over a steep grade in San Bernardino National Forest.





Pumping station houses Baldwin emergency engine which took over when electric power was disrupted for 40 hours during and after storm.



Howard C. Mandell, New Bedford Water Dept. superintendent, with George F. Burgess, pumping station chief engineer.

A CIVIL DEFENSE INSTALLATION

NEW BEDFORD, MASS. AVERTS WATER CRISIS

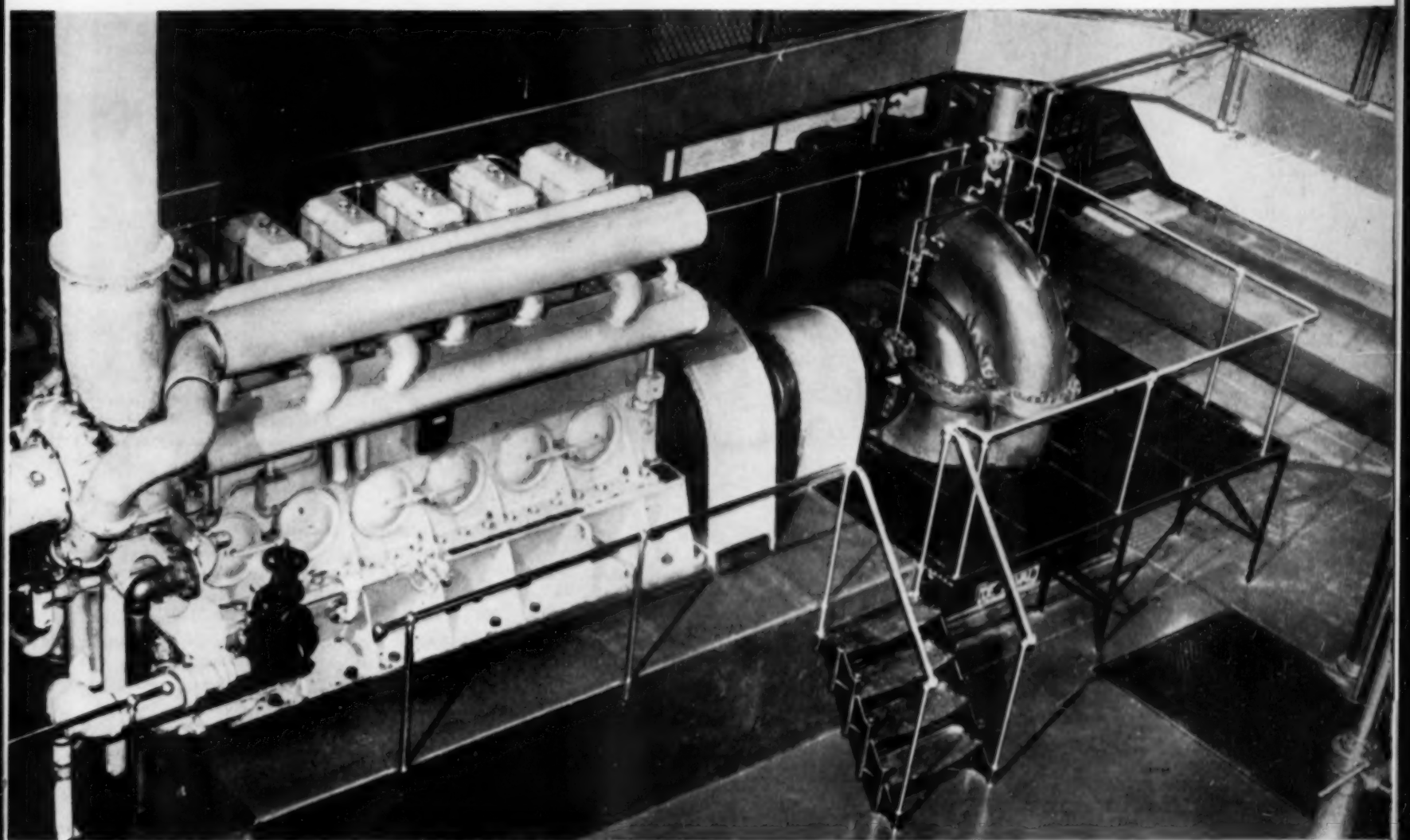
WHEN hurricane "Carol" struck New England in the summer of 1954, the foresight of New Bedford, Mass., officials paid off in a big way. The diesel-driven standby pump they had installed went to work when electric power failed and pumped 42,187,492 gallons of water for the 125,000 citizens of New Bedford, and for those in the bordering towns of Acushnet and Dartmouth. The hurricane cut off the electric power at 11:25 a.m. August 31 and current was not restored until 9 a.m. September 2. During that period, the diesel-driven pump operated a total of 40½ hours. For so many persons to have been without water for that long would have been a "major disaster," in the words of Howard C. Mandell, water department superintendent.

Originally, New Bedford pumped its water with two 10,000,000 gpd Leavitt steam engines. In 1950, the city turned to electricity, installing two 10 mgd and one 15 mgd motor-driven DeLaval centrifugal pumps. The pumping station is located on Little Quittacas Pond about 10 miles from New Bedford. It is served by a single feeder from the electric utility in the city. Recognizing the possibility of interruptions due to ice storms, hurricanes, strikes, etc., officials decided to include in the station a Baldwin diesel and a 75 kw General Electric diesel generating set to provide for plant needs.

Built by Baldwin-Lima-Hamilton Corp., the diesel furnishes 1000 hp at 600 rpm. It drives a 30,000,000 gallon-a-day DeLaval centrifugal pump. The engine has aluminum pistons with cast-in, steel lubricating-oil cooling coils. Cylinder liners are chrome plated by the Vanderhorst method. The engine and pump are connected by a flexible coupling.

The emergency pumping unit has been operated eight hours every week to keep it in good condition and to acquaint personnel with its operation.

New Bedford citizens daily consume about 20,000,000 gallons of water. This indicates the hardship that would have resulted had there been no diesel-pumping unit when the hurricane struck. A wind of 125 mph, and a tidal wave that flooded homes and factories, already had caused great damage and suffering. Fortunately, the rugged pumping



The 1000 hp Baldwin diesel turns a DeLaval centrifugal pump and has an Elliott turbocharger. The governor is Woodward, the heat exchanger Ross, and the exhaust silencer Maxim.

Hurricane "Carol" Knocked Out City's Electricity, But Foresight of Officials Who Installed Baldwin-DeLaval Pumping Unit Provided 125,000 Residents With Water for More Than 40 Hours

plant received no damage more severe than broken windows during the storm.

The Baldwin-DeLaval standby pumping unit is an investment of about $115,000, or about one dollar per capita, according to Mr. Mandell, who points out that this proved to be an economical insurance program for the population. Another feature is the economy of operation of the diesel as compared to the electrical operation. The 3-year average cost to pump one million gallons of water by diesel was $5.25 as compared with $8.00 for electricity to deliver the same gallonage.

Engine cooling is provided by a closed system. An engine-mounted pump circulates the cooling water through a shell-and-tube type exchanger where it is cooled by raw water. As a means of insuring proper lubrication and cooling, a separate motor-driven lubricating oil pump supplements the pump on the engine used for starting and emergencies.

Consulting engineers for the plant: Fay, Spofford and Thorndike of Boston, Mass.

THREE YEAR OPERATING LOG OF THE EMERGENCY PUMP

Year	Time Operated Hrs.-Min.	Gallons Water Pumped	Average Dynamic Head-Ft.	Gals. Fuel Used	Average Cost Per Gal. Fuel	No. Gals. Pumped Per Gal. Fuel	Fuel Cost To pump One Million Gals.
1951	512-45	434,960,000	181.5	21,845	$.1057	19,911	$5.30
1952	460	464,650,000	181.1	22,585	$.1028	20,573	$5.00
1953	414	402,450,000	182.3	20,178	$.1101	20,178	$5.46
1954	440-30	427,690,000	188.4	20,950	$.1080	20,415	$5.39

List of Equipment

Engine—Model 606-SC Baldwin supercharged diesel; 1000 hp at 600 rpm, 6-cylinders, 4-cycle 12-¾ in. bore, 15½ in. stroke.

Pump—DeLaval Type U30/24, single-stage, double-suction, centrifugal unit, rated 30 mgd at 184 ft. total dynamic head and 600 rpm.

Turbocharger—Elliott.

Governor—Woodward.

Flexible coupling—Falk Steelflex.

Oil filters—Hilco.

Exhaust silencer—Maxim.

Heat exchanger—Ross.

Air compressor—Quincy.

Fuel oil transfer pump—Roper.

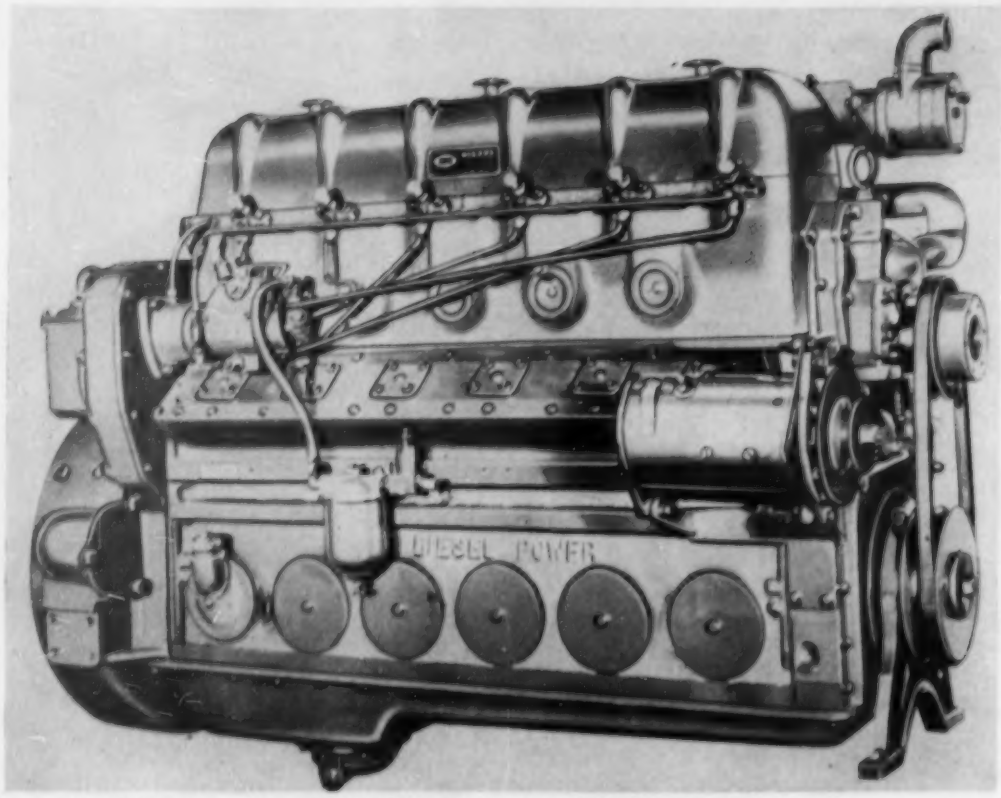
Thermostatic by-pass valve—Fulton-Sylphon.

Air intake filter—American.

Auxiliary engine—Buda, 160 hp.

Fuel oil—Shell No. 2.

Lube oil—Oilzum.



This is the 6-cylinder model P&H diesel engine, showing the mounting of the single Roosa Master fuel pump and the simplified fuel system.

NEW SIMPLIFIED FUEL SYSTEM FOR P & H DIESELS

AN entirely new fuel system, designed around the Roosa-Master pump, is now standard equipment on all diesel engines being produced by Harnischfeger Corp. The new pump, engineered strictly for P&H diesel engines, was developed in co-operation between Harnischfeger and builders of the pump, Hartford Machine Screw Co. (See DIESEL PROGRESS, April 1955, pages 54-55.)

Illustrating its unique, simplified design, Harnischfeger states that the new fuel system does away with a total of 131 separate parts and is 49.5 lb. lighter in weight. It is far easier to understand, and requires greatly less maintenance than the former system. Another feature of the new fuel system is easier starting with injection automatically retarded until engine speed reaches 500 rpm. Injection is then gradually advanced, matching the increased operating speeds. P&H states that this results in extremely fine idling characteristics as well as overall smoother operation. The engines are more responsive over the entire speed range.

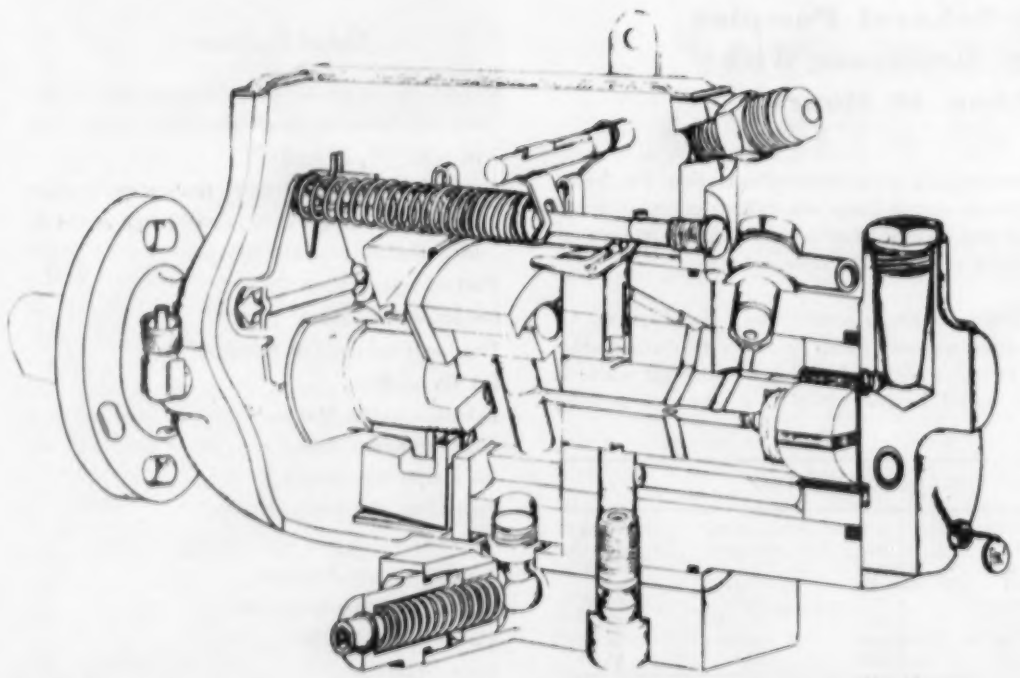
Engine torque characteristics are further improved with the new pump which, in mobile equipment, results in better performance and greater responsiveness to operator's control. Described as a single-cylinder, opposed-plunger, inlet-metering, distributor-type pump, it is a sealed and fully self-contained unit. It incorporates a built-in vane-type fuel transfer pump, governor, injection rotor with plungers and metering valve and distributor head.

The pump is self-lubricating and has no ball bearings, no operating valves, no gears. It has the same number of parts for each P&H model, from two cylinders through six cylinders.

Even greater operating economy is now obtained with P&H diesel engines, company executives say, because fuel calibration is inherent in the pump's design. It is impossible to exceed maximum fuel quantity needed. Another reason for increased economy is the sharp cutoff of injection. With this positive cutoff, pressure is instantly reduced to zero. There is no "dribble" of fuel and consequently, no excessive carbon build-up on injector tips and resultant clogging. For the same reason smoke is absent, company engineers state.

The Roosa-Master pump, without use of any external cams or valves, eliminates the separate pumps for each cylinder and the individual adjustments ordinarily required to time and balance the load of each cylinder. Also eliminated is a complex system of links, gears, racks, and cams. There is only one adjustment in the new system and this is set for the individual application of the engine. It is tamper proof.

Company officials say that premium lightweight fuels are not required; that P&H diesel engines with the new pump and injection system operate on any type fuel that will flow. Complete literature on P&H diesel engines with the Roosa-Master pump is available by writing Harnischfeger Corp., Crystal Lake, Illinois. Ask for Bulletin Z-15.



Cutaway view of new Model B Roosa Master fuel pump, described in detail in DIESEL PROGRESS, April, 1955.

Santa Fe diesel shop at Argentine, Kansas. Large bay or running maintenance repair area is at left. The higher section of the building is the large bay area where annual inspections are performed.

SANTA FE OPENS NEW DIESEL LOCOMOTIVE SHOP

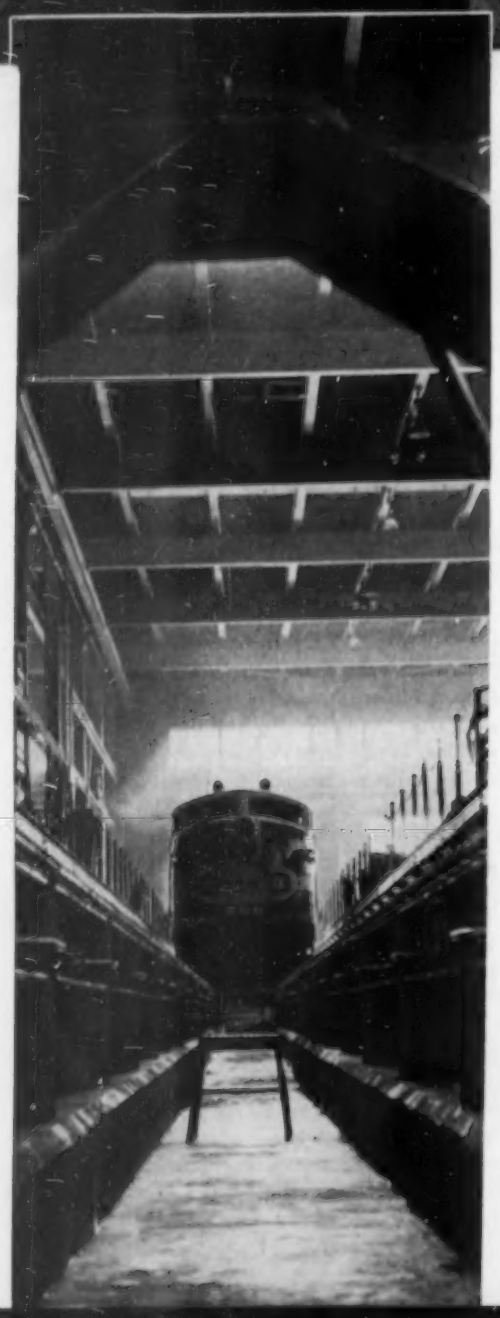
TO meet the demands of an expanded fleet of diesel locomotives, Santa Fe Railway has constructed at Argentine, Kansas, one of the most modern diesel servicing and repair shops in America. Featuring a large bay for annual inspections, a running repair bay for routine semi-monthly, monthly, quarterly and semi-annual inspections, a cleaning room, machine shop area, storehouse facilities and offices, the main structure of the new shop is a two-story building constructed of concrete and brick, covering an area approximately 400 by 238 feet. Servicing facilities and feed tracks, including a balloon track which circles the shop building, complete the new installation.

For annual inspection work, the large bay of the new shop contains three tracks with full-length inspection pits on thirty-foot centers, allowing plenty of room for working diesel units between the tracks. One track contains a two-level ramp for handling repairs to all types of diesel locomotives. Four hundred feet long and 100 feet wide, the bay is used for annual inspections on 130 to 150 switch engines and road type switch engines as well as seven passenger engines. All wheel work for freight engines will be handled in this area.

Three cranes, two 125-ton 30-ton and one 15-ton 5-ton service the entire room. There are four stalls with pit tracks inside the building in the running repair bay where semi-monthly, monthly, quarterly and semi-annual inspections are performed on approximately 400 diesel units. Each of the two pairs of pit tracks is serviced by a 5-ton overhead tram-beam hoist. In addition, two stalls outside the building are equipped with ramps for overflow running repair work.

One of the inside stalls has a two-level ramp for switch and road switch engines, and all stalls are equipped with lubricating oil supply and drain lines, clear water lines, treated water lines for cooling systems, power tool electrical outlets, and air lines. All lines are color coded. Removal of exhaust gases from the inspection bays presented a serious problem to engineers designing the shop. Blowers in the ceiling were not considered practical by themselves because of the type of heating system planned. Exhaust gases rise when hot and settle again as they cool, and it was decided to take advantage of the rising gases for their expulsion. Fresh air intakes were placed at intervals along the side walls of the shop at a height approximately that of a locomotive with ceiling fans above.

The net result of this arrangement is that fresh air from the intakes comes into the building below the exhaust gases as they rise and carries them to the fans above. The air at floor level remains relatively still and is not contaminated. Called a



Pistons, heads, liners, etc. and all small parts are overhauled and reconditioned. Parts in foreground have been reworked and are ready for assembly.

A road freight diesel locomotive pulls into the low bay area over an inspection pit for a running maintenance check at the Argentine shop.

A diesel is refueled and the steam generator filled with water at the fuel rack during servicing operations. In the vicinity are the sand towers, first operation in the service process.

"restricted circulation system," the plan is probably the most advanced method of air purification in American industry.

Reconditioning of pistons, liners, rods, injectors, fuel pumps, governors, cooling fans, traction motor blowers, water pumps, lubricating oil pumps and all miscellaneous small parts pertaining to the operation of a diesel locomotive is accomplished inside the small parts shop area. Electrical parts such as contactors, relays, train control governors, train stop receivers, etc., are also repaired and rebuilt in this shop. "A diesel shop," explains master mechanic V. L. Marlo, who is in direct charge of the facilities, "carries on about the same type of operation as an automotive garage. The difference is in the size of the engines and the scale of operation. Many people fail to set up a regular inspection program for their car, because a failure means little more than personal inconvenience. In railroading, however, it's easy to see that maximum performance is necessary."

The diesel shop office force is housed in two air conditioned offices on first floor. Here it is that engines are dispatched and all records pertaining to inspections and repairs are kept. The nerve center for the communications system is housed in the office, and time cards are prepared and filed here. Engine parts and filters are cleaned in the cleaning room located next to the small parts section. For running repair work approximately 70 lubricating oil filters are cleaned and repacked each day and 400 engine and carbody filters are cleaned, dipped and spun dry. The cleaning section is equipped with tanks for cleaning pistons, heads, liners and small engine parts and with a Farr Filter Machine for cleaning engine air filters.

Outside the main building alongside the large bay area is an outside crane section approximately 80X425 feet in size. Serviced its entire length by a 30-ton 5-ton crane, the area is used for loading and unloading wheels, traction motors, generators, etc. from freight cars, and also serves as a wheel storage area. Improvements to this area are planned in the future. All engines arriving at Argentine are serviced by the facilities adjacent to the main shop building. Sand towers, truck spray, fuel rack and washing machine are aligned for progressive operations. First stop is at the sand towers.

Six sand towers — three for each of the two service tracks — have a capacity of ten tons of sand each. The sand flows from the towers by gravity through hoses into the locomotive sand boxes. After sanding, locomotives move through the automatic truck spray where cleaning solution is applied to the trucks. The solution is allowed to remain on the trucks for from 10 to 15 minutes while refueling takes place, in order to dissolve grease and road grime from the undercarriage.

At the fuel rack, fuel and lubricating oil are replen-

Top, right. **Foreman John R. Burch is shown operating a magnaglow inspection unit used to search for flaws in liners, heads, rods, pistons, etc.**

Right. **244,500 pounds of diesel locomotive are lifted into the air as two 125-ton cranes move a Baldwin diesel switch engine. Shop foreman Harry French directs operations.**

ished, and the steam generator is filled with water. Each unit receives up to 1200 gallons of fuel and up to 1800 gallons of de-mineralized water. Engine rooms are cleaned, brakes adjusted and miscellaneous inspection work is performed here. Trucks are rinsed with a water spray under 300 pounds pressure to remove the cleaning solution, and the locomotive moves into the Whiting washing machine where rotary brushes wash the carbody proper. A final rinsing, and the locomotive is again ready for use on the road.

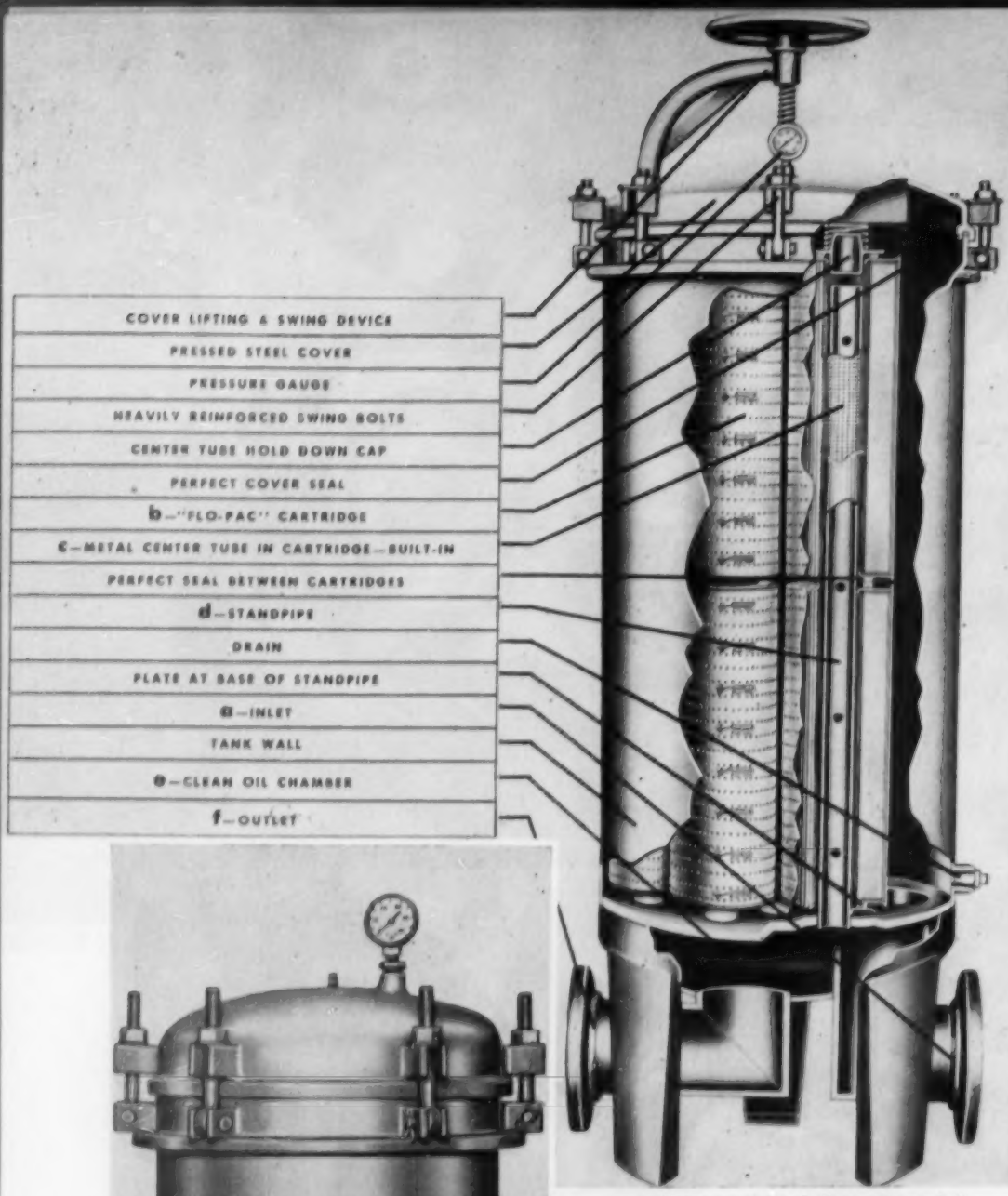
Some 650 tons of sand, 1¾ million gallons of fuel and between 40 and 60 thousand gallons of lubricating oil are distributed by these facilities each month. One hundred forty to 180 diesel units are serviced each 24 hours, or approximately one every 10 minutes around the clock. High pressure pumps for the truck spray in the servicing area as well as pumps for cleaning solution, water and lubricating oil distribution are housed in the service building located near the service area. Fuel oil is stored in underground tanks and is pumped to the fuel rack as needed.

Air compressors for maintaining pressure in air hoses throughout the shop area are in the power house near the main shop building. All sections of the shop and servicing areas are reached by an intercommunication system, which is arranged to allow direct contact with the railway's main switchboard at Argentine, Kansas.

NEW LINE OF HONAN-CRANE OIL FILTERS

A new line of Honan-Crane multi-cartridge oil filters has been introduced by Houdaille-Hershey of Indiana, Inc. These filters feature operating convenience and are engineered for flexibility. The latter characteristic lies in the fact that six different types of cartridge refills may be used interchangeably. Each cartridge is designed to do a specialized filtering job depending on type of oil, flow rate required, kind and degree of contamination, and other variable factors.

At the same time, the introduction of a new Honan-Crane line of full-flow filters and full-flow cartridge element has been announced. This new full-flow cartridge, called "flo pac," is heavy, resin-impregnated, pleated paper. Its 44 sq. ft. of filtering surface provides unusually large dirt holding capacity, according to Houdaille-Hershey of Indiana. This paper is formed around a perforated rigid metal center tube, which will withstand 100 psi, and is enclosed in a treated paper cover. A cork gasket on each end provides a perfect seal even when cartridges are double decked.



Cutaway view of Honan-Crane full-flow filter showing details of construction and operation.

The Model 15F-4 Honan-Crane filter contains four elements and has a flow capacity of 100 gpm.

The swing bolts and lifting device shown here permit a man to remove the cover on the larger model filters without difficulty.

Flow rate through each "flo pac" cartridge is 25 gpm for 170 SUS oil; maximum of 4 psi initial pressure loss across the filter. The cartridge is designed to retain initially 98% of all particles of 20 microns or larger. In operation, smaller particles will be removed through the accumulation of solids which increase efficiency of the filter, according to Houdaille-Hershey officials. This cartridge is completely inert and will not remove additives found in many petroleum products. The paper filter element is unaffected by water. The filter elements are made in one size and are used in groups of up to a maximum of 36 to get greater flow capacities.

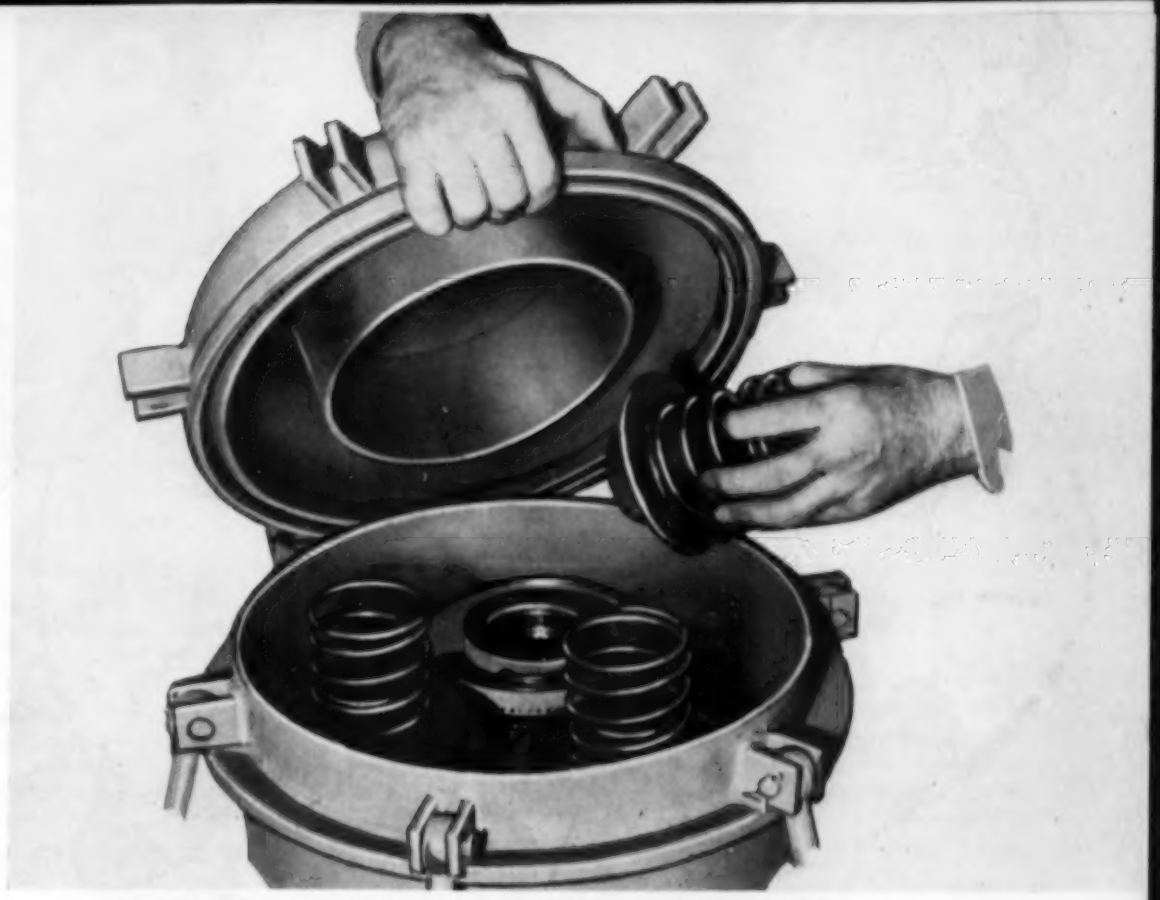
They have been designed primarily for full-flow engine lube oil filtration where high flow rates at very low pressure drops are required, but can also be used effectively to filter fuel oil.

The new line of full-flow filters is available in nine sizes, using one to 36 cartridges to meet a wide variety of capacity requirements. Flow rates range from 25 to 900 gpm.

Full-flow lube and fuel oil filtration has gained wide acceptance with engine manufacturers and operators because full-flow units continuously filter every drop of oil in the system, thus assuring clean oil at all times. This, of course, helps cut down engine wear, and thus contributes greatly to economical and efficient engine operation.

The new filters feature quick opening covers on all models. On the smallest models, the cover is fastened by a single bolt. This threaded bolt extends through a cover fitted with a neoprene O ring for sealing and screws into the top of the filter standpipe to tighten the cover. On medium sized units, the cover is fastened by six swing bolts. When loosened, they swing down and release the cover, permitting easy access to cartridges. One man can easily lift the cover. Larger models are equipped with a special cover-lifting device. After swing bolts have been loosened and swung free of the cover, a few turns of the lifting wheel raises the cover and allows it to be moved to one side. The covers of all models provide for quick and easy removal. Covers on all models have a neoprene gasket set permanently in a groove. This oil-resistant gasket forms a tight seal between cover and tank, and prevents oil leakage under maximum operating pressures, the manufacturer states.

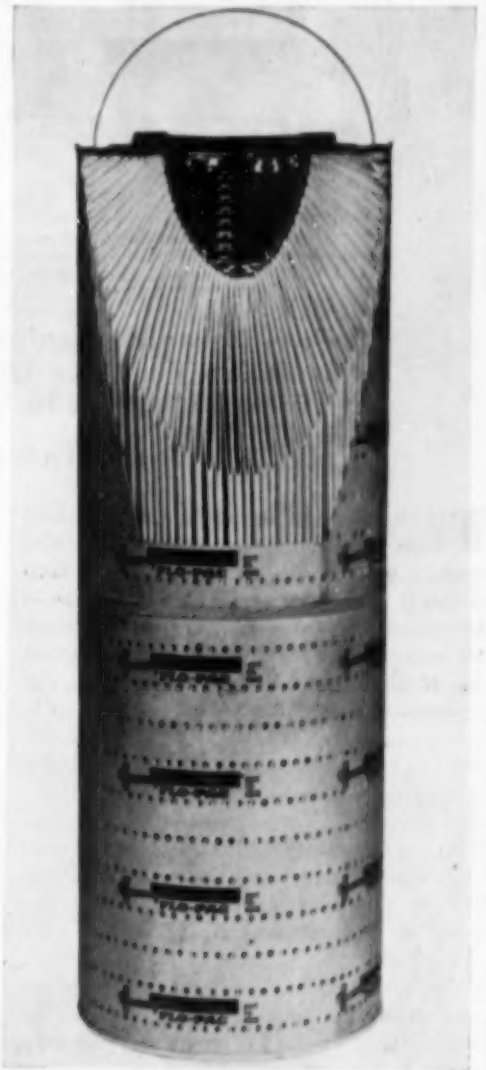
A simple and effective holding device consisting of a metal cap and coil spring assembly fits on top of each cartridge in contact with a gasket. When cover is fastened down, the spring compresses and exerts the necessary pressure to lock the cartridge firmly in position. This arrangement holds the cartridge in vertical position and insures against by-passing of oil when full-flow elements are installed. On the smallest models, the hold down cap is attached to the bolt which extends through the cover. All full-flow filters are equipped with standpipes of large diameter and large inlet holes to permit fast unobstructed flow of oil. Piping sizes in full-flow units range from 2 in. on the smallest, one cartridge model, to 8 in. on the largest, 36 cartridge model. These sizes are accurately calculated to handle the maximum flow capacity of each unit.



The hold-down cap arrangement, a feature of the filters made by Houdaille-Hershey of Indiana, Inc., is shown in this picture.

The Model 8F-1 is the smallest unit in the Honan-Crane line. It utilizes one element and has a flow capacity of 25 gpm.

The new "flo pac" full-flow filter cartridge for Honan-Crane oil filters is shown here, partially cutaway.



In this air age, the Arctic area around the North Pole actually "connects"—more than it separates—the world's industrial and military powers, all of which are in the Northern Hemisphere. This accounts for the increased tempo of activities in the Arctic—by Soviet Russia, United States, Canada and other nations.

Radar Defense Against Jet Bomber Attack, Search for Weather Information, Both Utilize Diesel Engines in Varied Applications

By MARK OGDEN

TO give United States citizens three or more hours of warning should Red jet bombers attack, a chain of Distant Early Warning radar stations is being built across the northern rim of the continent. Called "the DEW Line", for short, this project is but one phase of the joint defense plan of the United States and Canada. The U.S. has assumed responsibility for constructing and installing equipment in the DEW Line. When completed,—probably not for several years—the most serious gap in our defense perimeter will be closed. Until completion, despite extensive Red activities of various types in the polar region, little or nothing of military consequence lies between the great U.S. Air Force Base at Thule, Greenland, and several potent installations in Alaska.

Just what is going into each radar outpost is not public knowledge. But all of us certainly know two things,—that electricity is required to operate radar and radio, and that no power lines traverse the haunts of the polar bears. Thus, it could be no secret to potential enemies that quite a few diesel generator sets are going to be installed along the DEW Line. As a matter of fact, several hundred diesel generator sets, for stand-by purposes, already are in use in the radar stations spaced along both the Atlantic and Pacific coasts where utility lines normally provide electricity. Futhermore, it is a well-known fact that winterized construction equipment powered by diesel engines, is used at the Far North bases of both the U. S. Air Force and Canadian Royal Air Force. This type of equipment also is used at the five Arctic weather stations maintained jointly by Canada and the U. S. Weather Bureau. It may be anticipated then, that quite a few dieselized tractors, with bulldozers and snow plows, will be used in construction of the DEW Line. Later, some of this equipment undoubtedly will be assigned to the stations to keep landing

fields and "streets" cleared of snow and ice, and to pull sledges between landing strips, beaches, and personnel camps.

Building the DEW Line presents a few problems that stir the imagination. Most of the line, apparently, will be 200 or more miles north of the Arctic Circle. Although factual and speculative information in considerable detail has been printed about the DEW Line in all of the weekly news magazines, most of the persons approached on the subject by this writer were cagey, having been warned that the whole project is super-secret. Specific information, therefore, has been a little hard to obtain. However, it believed that one group of experts favor establishing the line, roughly, along the seventieth degree of latitude. (The western U.S.-Canadian border is south of the 50th parallel, and the Arctic Circle is on approximately the 66th parallel.) Others advocate starting at about 70° in northernmost Alaska, but following more closely the Arctic Sea shoreline across the archipelago. This would place portions of the line several hundred miles nearer the North Pole,—and Soviet territory. Advocates of the latter locations contend that the stations could be supplied annually by ships,—now that the new and powerful Navy icebreaker "Glacier" is ready for service. Opponents of the northernmost locations fear the radar warning network would pick up normal Soviet airplane movements and thus set off "false alarms." In addition, there has been some debate as to the relative amounts of atmospheric disturbances in the two regions under consideration.

Whatever the location, and under any circumstances, great quantities of materials, mostly big and heavy, must be transported over miles of Arctic wasteland. Even if ships and cargo planes can be used, they can't put construction materials down on the precise places where radar plants and camps will be located.

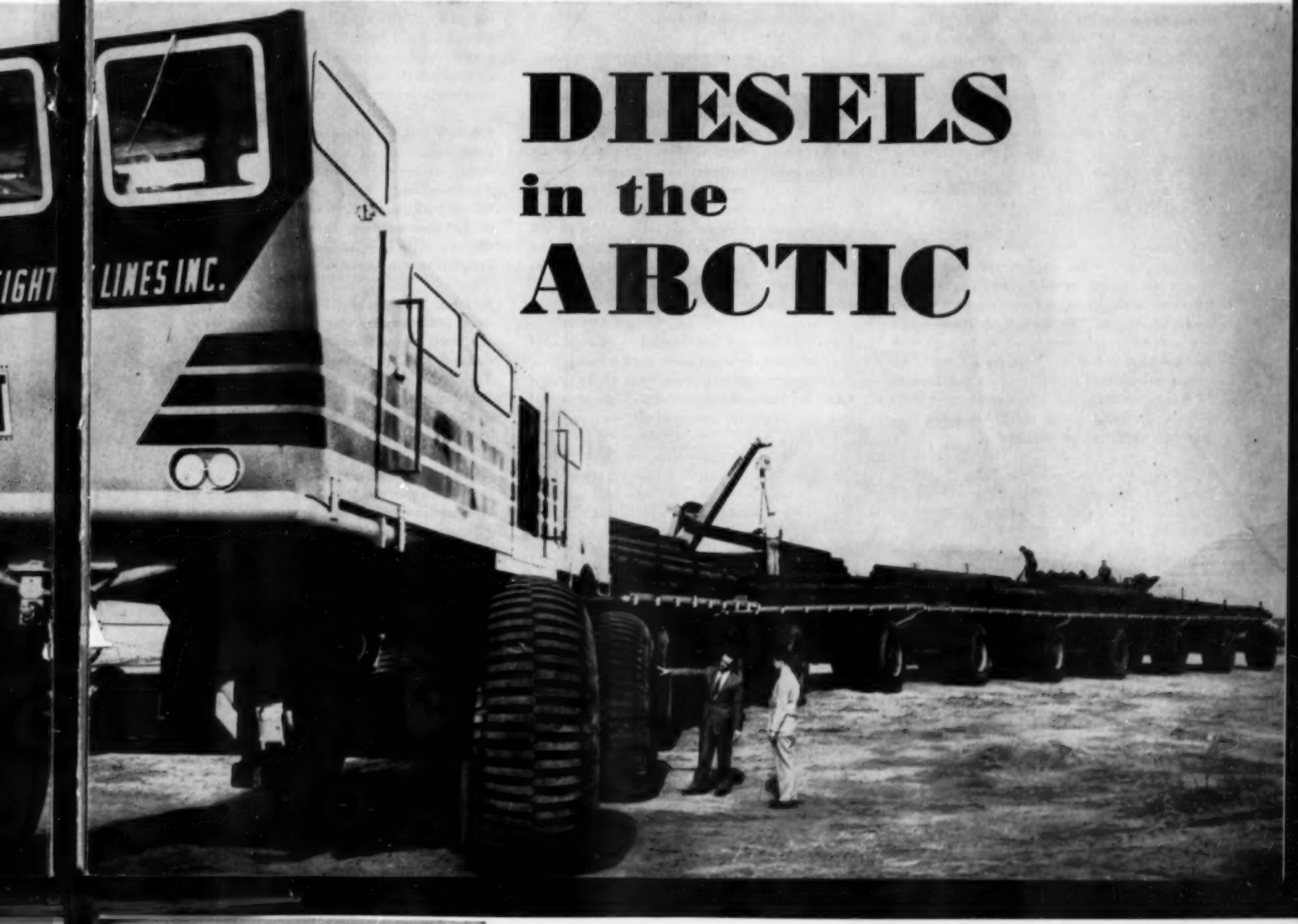
If officials of R. G. LeTourneau, Inc., Longview, Texas, and the Alaska Freight Lines, Inc., are correct in their appraisal of the transportation job to be done, the U.S. can rely on land transportation even though railroads and highways do not exist in the Arctic. They think transportation of heavy supplies to build and maintain the DEW Line can be handled by a mammoth diesel-electric vehicle. LeTourneau has built the first of these wasteland trains and has christened it the *Sno-Freighter*. Designed and built especially for this duty, the first Sno-Freighter was delivered to the Alaska Freight Lines in Fairbanks early enough this spring to test its performance before thawing weather. This small Alaskan city is the northern terminus of the 1523-mile Alaskan highway. The Alaska railroad ends there, too. A road goes 120 miles farther north, to Circle City, on the Yukon River, but beyond that there aren't even trails across the tundra.

The LeTourneau Sno-Freighter is the world's largest vehicle on rubber tires,—274 ft. long and 12-⅓ ft. wide. It is coupled together in six sections so it can turn a corner—in case a corner is met in the roadless northland. The cargo carrier crosses the Arctic snow and mud on 24 rubber tires,—so large one could not be rolled through the door of a home. The tires are mounted on LeTourneau electric wheels which provide each section of the train with independent driving power.

Two Model NVHBI-12 Cummins diesels are the prime movers, each rated at 400 hp. Each engine turns a LeTourneau ac and a dc 150 kw generator, the three units coupled in-line. The ac generator rotor shaft splines to an adapter, bolted to the engine flywheel. The dc armature bolts directly to another adapter, splined to the other end of the ac

To cope with roadless Arctic distances, R. G. LeTourneau, Inc., built this "Sno-Freighter" for Alaska Freight Lines, Inc. It is powered by two 400-hp Cummins diesel-electric generator sets. Engines and generators operate at 2000 rpm and are hydraulically governed by Woodward units.

DIESELS in the ARCTIC



Looking forward through the engine compartment of the Sno-Freighter, one of the two Cummins diesel-electric units is seen in place. A hot-air heater burns diesel fuel, keeps personnel, engine, lube and fuel, and air at normal temperatures.

Note the in-line arrangement of Model NVHBI-12 Cummins engine, the ac, and then the dc generators. The generators are LeTourneau-built. Also note the Schwitzer-Cummins thermatic fan, and compressor.

generator rotor shaft. Engines and generators are operated at 2000 rpm, and are hydraulically governed by Woodward PSG governors. The engines are equipped with Schwitzer-Cummins thermatic fan assemblies for thermostatic control of fan speed from temperature of the engine coolant.

In this new system for delivering driving power an electric motor and gear reduction is located inside the rim of each wheel. Low-pressure tires, 88 in. in diameter and 38 in. wide, are mounted on the wheels for traction and flotation over snow and frozen surfaces. The rear axle of each car is pivot-suspended on the main frame member, which keeps all four wheels of the car on the ground and driving. Front axle supports are fastened rigidly to the main frame, but the axles are free to swing left or right for steering.

The Sno-Freighter's decks are 8½ ft. above the ground to protect the engines and cargo while streams are forded or while traveling through drifts and brush. All cars are water-proofed up to a height of six feet. The control cab commands a view around the horizon, being 17 ft. high with double-walled, tinted windows on all sides. All operational controls are on a panel just beneath the front-central window. The control car is made of metal, insulated against the 50-below-zero temperatures which are encountered.

The crew's accomodations are immediately behind the control station, with the generator sets and the 2100-gal. fuel tank at the rear of the car. Bunks for a 4-man crew are provided. The compartment is heated by Stewart-Warner diesel-burning hot air heaters. Engine fuel and air thus is delivered to the diesels at average temperatures. One man can operate the controls. His job is primarily to steer the two front wheels. Each following section will automatically track the car immediately ahead.

Each of the five cargo cars has a load capacity of 25 tons. Despite the massive construction, the huge loads, and the unworked trails over which it travels, the Sno-Freighter proved in tests that it could maintain load stability at all times. Over rough terrain, the car couplings and wheels rock and gyrate in rough going, but beds of the cars have only slight undulations. This load stability is achieved by an original axle suspension system, and by coupling all cars through a universal joint and a long steel tube which resembles a wagon tongue. Also, the cars are cushioned against normal shocks by flexing of the huge rubber tires.

Requirements for operating off highways in Arctic temperatures over both snow drifts and frozen surfaces were determined in conferences between LeTourneau engineers and officials of the Alaska Freight Lines. Features incorporated in the vehicle to meet these conditions include: 1. Extra wide-base tires for flotation over snow; 2. Aluminum construction wherever practicable to reduce weight; 3. Thermostatic control of ventilation to the engines; 4. Natural rubber for electric cable insulation and oil seals to maintain pliability in extremely low temperatures; 5. Lever-operated disconnects on electric junctions for uncoupling cars without exposure of hands.

Lubricants that will not congeal in extreme cold is a problem upon which much work is being done. In its regular over-highway trucking, Alaska Freight Lines use Standard Oil products—"ordinary diesel fuel and 20 wt. Super-charged oil."

Alaska Freight Lines executives and drivers gained their knowledge of Arctic freighting during the last six years. Their dieselized trucks haul into Fairbanks over the Richardson and Alaska highways from the port city of Valdez, and from the ports of Seward and Anchorage over the Glenn, Richardson and Alaska highways. Experienced drivers claim that they encounter their best trucking conditions in winter when temperatures range between 30 and 50 degrees below zero.

The owner of Alaska Freight Lines is Alfred Ghezzi, Jr., whose headquarters is in Seattle. His executive vice-president is Eugene W. Hundley. They keep an average of about 25 Kenworth trucks on their Alaska highway operations. These are powered by 300-hp Model NHRBS Cummins engines. Recently, the company took delivery of 12 new Kenworth Model CBE trucks with Model NT-6-B (turbocharged) Cummins diesels. Several years ago, Alaska Freight Lines had the Kenworth factory build a special on-the-highway truck, powered with a Model NVHB-12 Cummins engine developing 400 hp at 2100 rpm. Designed for special hauling jobs only, its weight made it impractical for normal highway freight hauling. However, the experience gained in operating this unit was utilized to good advantage in working with the LeTourneau engineers to perfect the Sno-Freighter.

For their part, LeTourneau officials also have had prior experience in building huge vehicles for swamp, equatorial desert, and snow operations. The "Sno-Buggy" is an example of the latter. It utilizes both the electric wheel, announced in 1953 by LeTourneau, and the flotation and traction efficiency of the huge rubber tires found on the Sno-Freighter now in Alaska.

As far as Cummins diesels are concerned, two of them (150 hp each) were direct-connected to the generators in the *Snow-Cruiser* built in 1936 for Admiral Richard E. Byrd's Anarctic Expedition. The *Snow-Cruiser* was designed by the Research Foundation of Armour Institute of Technology and was built in the plant of Pullman Standard Car Co. (See DIESEL PROGRESS, November, 1936.)

The question may arise in your mind: Why this great interest in the Arctic? Aside from the atomic-age defense aspects, there are two other reasons which have definite, if somewhat remote, bearing on the welfare of each of us. First, agriculture, industry and transportation all have come to realize the economic importance of knowing more about weather in general and weather forecasting in particular. Weather situations that affect large areas of Canada and the United States initially make up in the polar regions. Second, natural resources exist in the Far North and await development. Some of the greatest mining and oil field developments of recent years have occurred in Canada. Each year, such activities creep farther and farther North. Alaska businessmen, strong for statehood,

Kysor Automatic Shutters control air temperature in engine compartment. As shown at top of circle, they are thermostatically controlled by engine coolant. Shutters are air-actuated from compressors installed on each engine.

point to huge gas and petroleum reservoirs on the uppermost corner of the continent, beyond the rugged Brooks Range. They also mention the Gubik gas fields only 500 miles north of Fairbanks. They contend that the Far North has untold wealth, awaiting discovery. Executives of the Alaska Freight Lines undoubtedly are alert to these potentials and are preparing themselves to be in on the ground floor when the need for cross-country transportation develops.

The Canadian and United States governments jointly man four weather stations across the archipelago which composes the Canadian District of Franklin. By agreement with Denmark, the United States also operates a weather station at Thule, Greenland, in conjuction with the great air base there, and exchanges information with another weather station maintained by the Danes on the eastern shore of Greenland.

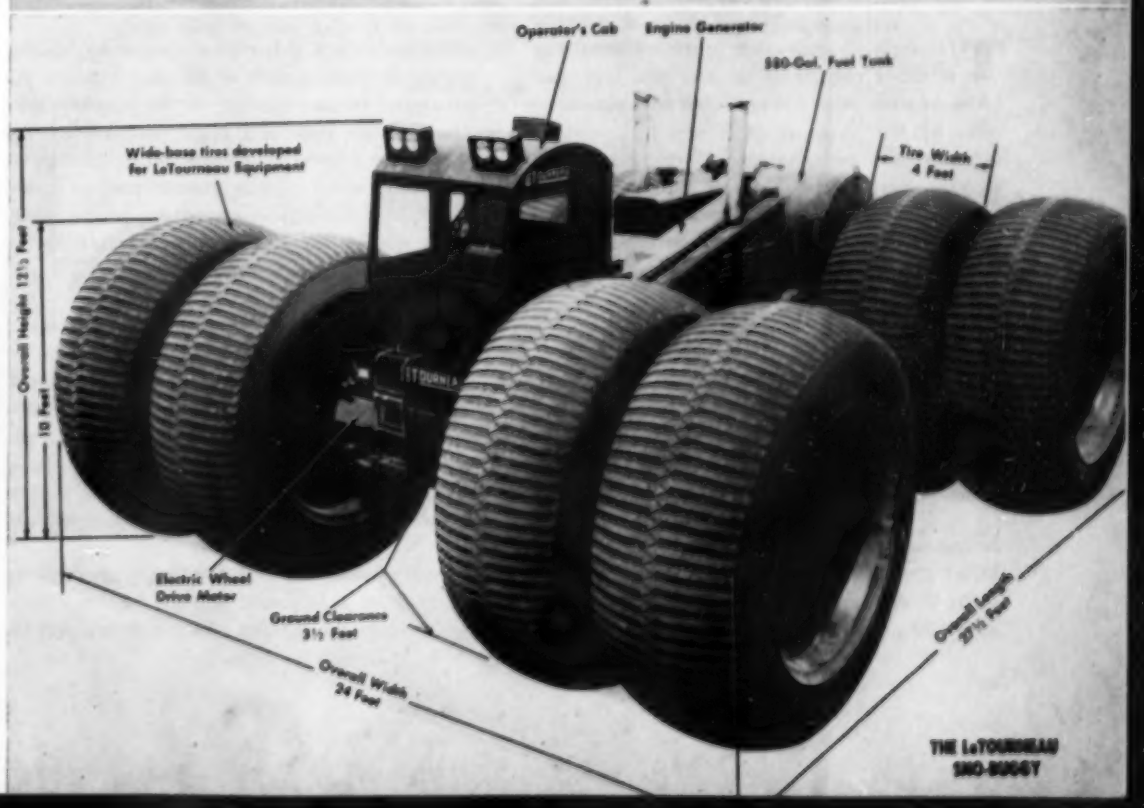
Late each summer, it usually is possible for cargo vessels, accompanied by ice-breakers, to haul supplies to two or three of these weather stations. The others, however, must be served by gigantic spring airlifts. No one contends that airplanes are economical for delivering either groceries or scientific instruments. Therefore, it is not unlikely that, eventually, diesel-powered off-highway vehicles such as the Sno-Freighter will provide the permanent means of supplying both the radar and weather stations that soon will rim the top of the continent.

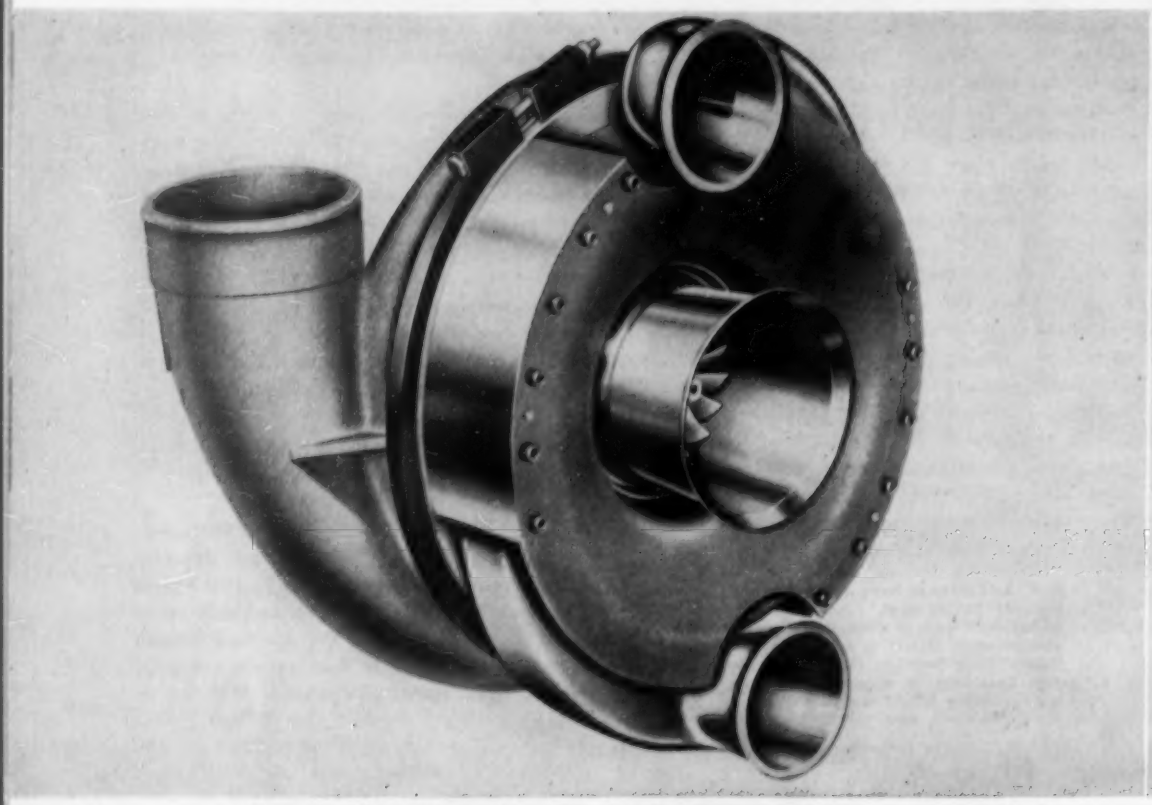
Colonel Bernt Balchen, U. S. Air Force expert on Arctic activities is fond of saying that the North Pole is the center of the civilized world. A glance at the accompanying map of the polar region, will establish his contention. All of the industrialized nations, who are also the world's military powers, encircle the globe in North Temperate latitudes. The short-cut between these nations, lying on opposite sides of the world, is across the polar region. The public's attention was drawn to this fact recently when a Scandinavian air line inaugurated passenger service across the top of the world, but it has long been recognized by military strategists.

Soviet Russia has widely publicized the fact that it has a weather and communications base on a floating ice island on the North American side of the North Pole. The Reds also are known to have guided missile bases, pointed toward the United States, scattered throughout Siberia. Some persons who believe themselves to be experts in such matters, claim that, within a few years, the Reds will have perfected missiles that can reach and destroy New York City within 30 minutes. Regardless of whether this prediction proves to be fact or fantasy, counter-measures to detect and destroy such missiles are being perfected now in this country, and the DEW Line fits into this pattern.

Students of Red naval activities credit them with submarines capable of operating for long distances under the polar ice fields, and much more is known and suspected of Soviet activities in the Arctic,—enough to arouse the hope that the LeTourneau Sno-Freighter will quickly mark up another great achievement for the diesel engine.

R. G. LeTourneau has pioneered other gigantic rubber-tired equipment for off-highway work in snow, desert sands and swamps. Below is seen the Sno-Buggy. Note flotation compared with men knee-deep in snow. For swamp travel, similar machine uses only four tires.





The compactness of the design of the new Miehle-Dexter turbocharger is shown in this view of the Model 5.5.

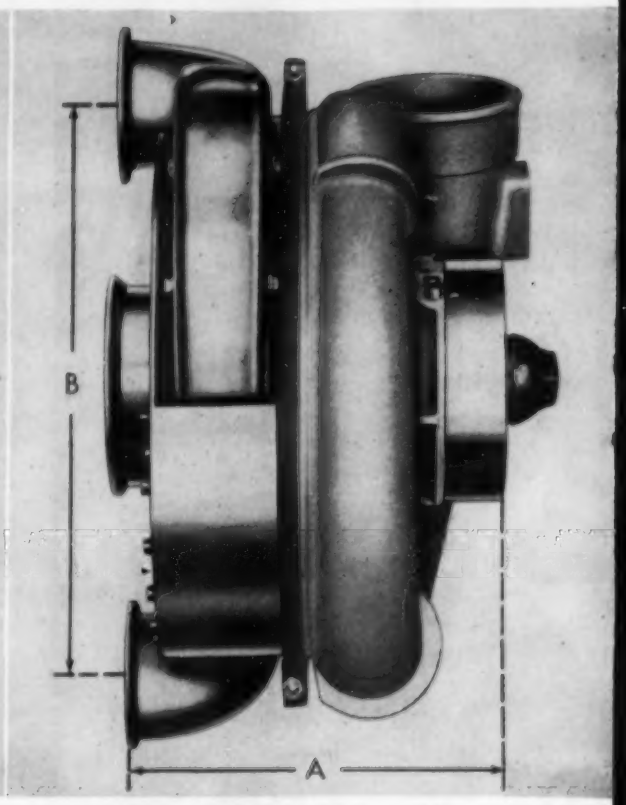


Figure 1, referred to in the article below. A and B correspond to the dimensions in the table of model sizes.

MIEHLE-DEXTER TURBOCHARGERS FOR HIGH-SPEED DIESELS

By BRUCE WADMAN

THE rapid progress made in the turbocharging of diesel engines of all sizes and types has taken another step forward with the announcement by Miehle-Dexter of a new high-pressure, exhaust-driven turbocharger, suitable for use on automotive-type diesels. These units have been developed under a license agreement with De Laval Steam Turbine Co. The design incorporates the unique and performance-proven features of the De Laval high-pressure turbocharger. The Miehle-Dexter turbochargers are designed for application on engines ranging in power output from 50 to 1000 hp. They are now being tested by manufacturers of both two- and four-cycle automotive-type engines, for service in road and off-highway vehicles, stationary and marine power plants, and a variety of other uses.

In common with the De Laval turbochargers, the Miehle-Dexter units are of monorotor construction —that is, the compressor impeller and the turbine wheel are combined in a single rotor structure, the aerodynamically highly refined compressor blading being carried on one side of the rotor hub and the centripetal turbine blading on the opposite side. The complete rotor is a single precision casting, made from a special super-strength high-temperature alloy, which permits great accuracy in manufacture and the attainment of the precise blade shape needed for this high-performance turbocharger, according to Miehle-Dexter.

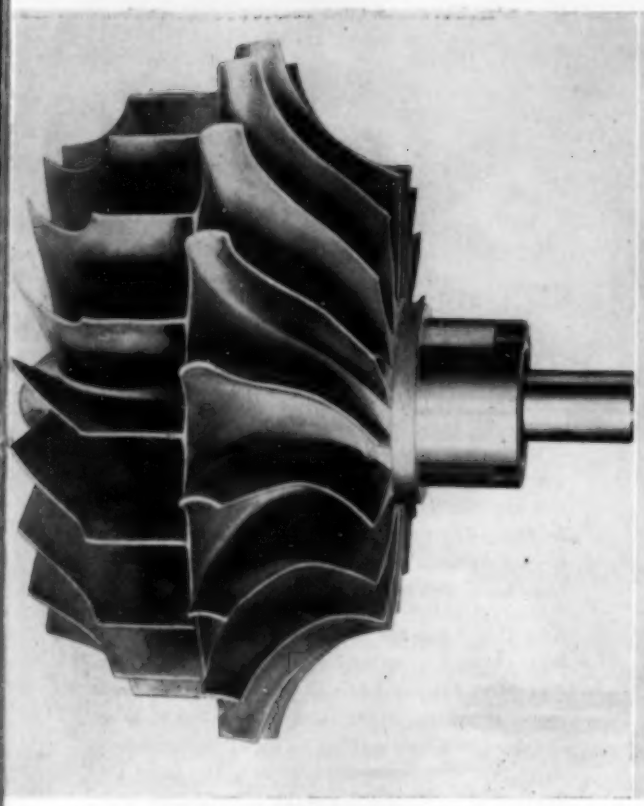
The monorotor type of construction eliminates the possibility of windage and leakage losses because of the combination of the compressor impeller and the turbine wheel in a single unified rotor structure, and thereby contributes to the high efficiency of the Miehle-Dexter units. In addition thereto, this type of construction permits cooling of the turbine side of the rotor in a simple manner.

A small quantity of the air handled by the compressor impeller is by-passed into the turbine. There it is directed (in the form of a thin sheet) over the turbine rotor hub, guarding it from heat of gases.

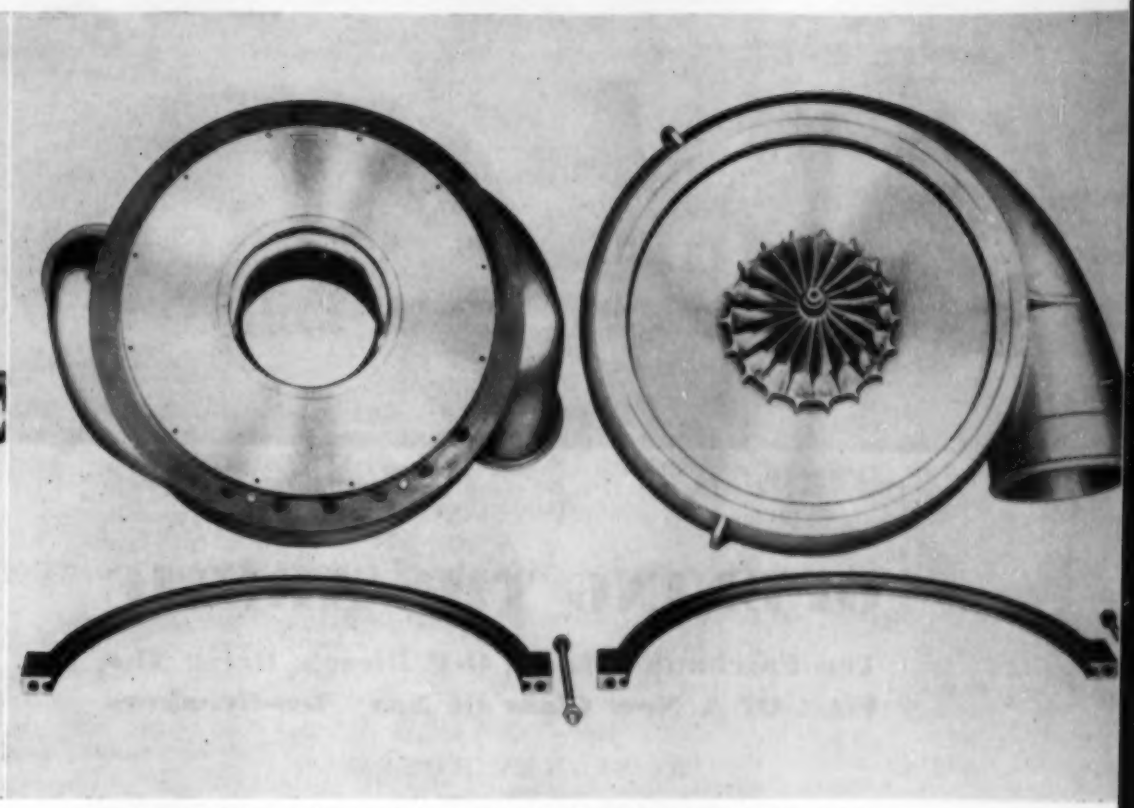
Another unique construction feature is its specially-developed anti-friction rotor bearings, the flexible mounting thereof, and their self-contained lubrication. This rotor mounting results in exceptional bearing reliability and long bearing life, even under conditions of accidental rotor unbalance (which can occur in service), severe engine vibration or shock loadings encountered by the engine-turbocharger combination.

The new turbocharger is completely independent of the engine—not only with regard to lubrication of the unit, but also with regard to engine cooling-water requirements. No water jacketing of any kind is used—a fact that contributes to the compactness and lightweight of the unit.

While the turbine wheel operates with full admission and steady flow, and therefore with very high efficiency, provisions have been made for the re-



The Miehle-Dexter turbocharger rotor, showing the unique construction. The turbine wheel is at the left, and the compressor at the right.



Turbine nozzle box is shown at left, compressor housing, with rotor installed, at right. Below are clamps that hold these assemblies together.

covery of the energy in the engine exhaust pulsations. These provisions amount, essentially, to incorporation of the De Laval pulse converter system into the turbine nozzle box. For careful matching of the turbocharger to the engine, the turbine nozzle guide vanes are so constructed that their position can be varied in the field. This adjustable turbine nozzle guide vane feature means that the turbine can readily be adapted to a wide range of engine flow requirements or engine operating characteristics.

Because the Miehle-Dexter turbocharger is extremely compact, unusually light, and can be mounted either vertically, horizontally, or in any angular position, it is easy to mount on the engine in such a manner that a clean and neat installation is achieved. This objective is greatly facilitated by the versatility of the unit, which permits rotating the compressor housing vs. the turbine nozzle box into any angular relationship desired.

Experience in the field, particularly with large engines, has demonstrated the important effect of turbocharger compressor efficiency, turbine efficiency and pressure ratio on the engine output, fuel consumption, and thermal loading. The Miehle-Dexter turbocharger sets high standards for the automotive engine field with regard to these all-important turbocharger characteristics. The high pressure ratio of up to 3:1, and the high performance of the turbocharger permits possible doubling (and in some cases as much as tripling) the engine output, while at the same time reducing the engine specific fuel consumption, according to Miehle-Dexter officials.

Any turbocharger, because mechanically it is independent of the engine, is self-regulating; however, to achieve instantaneous response to engine load changes the extremely light weight, the low enertia of the rotor, and the high turbine torque characteristics of the Miehle-Dexter turbocharger combine to give excellent performance. For special applications, the unit can be supplied with automatically adjustable turbine nozzle guide vanes, for example, to achieve increasing engine torque with decreasing engine rpm.

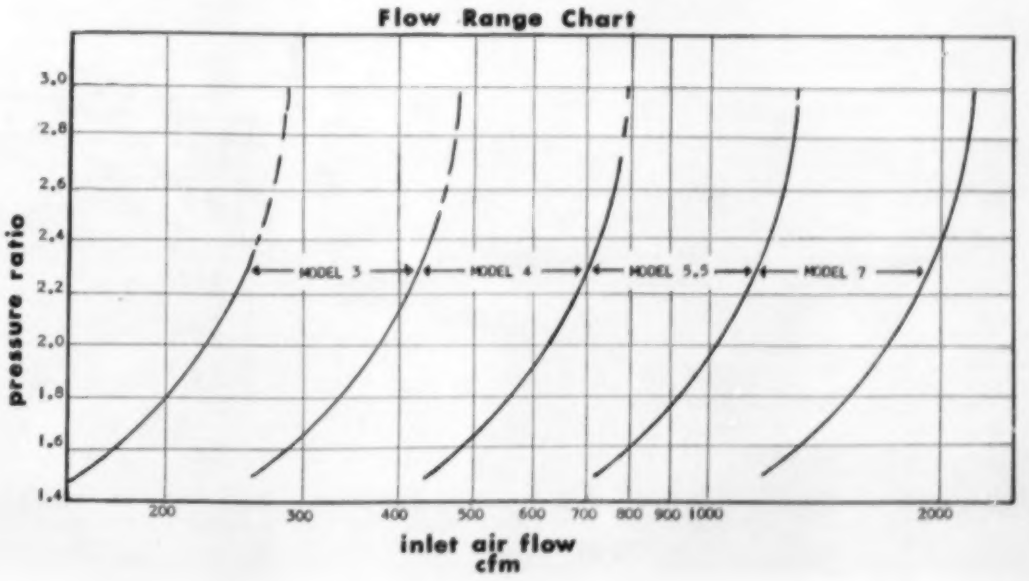
The new Miehle-Dexter turbocharger will be manufactured in four standardized models, to suit a very wide range of engine sizes. Approximate dimensions for the various models are shown in the table below. The dimensions A and B in the table refer to Figure 1. Weights of the four units vary, from approximately 20 lbs., for the smallest size, to 75 lbs. for the largest.

DIMENSIONS BY MODEL

Model		3	4	5.5	7
A	–	4.91"	6.54"	9.00"	11.45"
B	–	7.26"	9.68"	13.30"	16.92"

Finally, what do developments like this mean to the engine user? It simply means, according to Miehle-Dexter officials, that he will be able to buy diesels that will deliver more power, with less weight per horsepower. He also will get better performing engines, with better fuel economies and cleaner combustion.

Chart shows the flow range of the four models of Miehle-Dexter turbochargers. Note the pressure ratios obtained on the vertical scale.



Launching of the *USS Glacier* at the Ingalls Shipbuilding Corp. at Pascagoula, Miss. The vessel has 10 Fairbanks-Morse 12-cyl. O-P engines, protected by Briggs filters. The pontoons are for launching purposes only.

OPENING THE ARCTIC

Ten Fairbanks-Morse O-P Diesels Drive The First Of A New Class Of Navy Ice-Breakers

By SIDNEY HOFFMAN

THE Arctic region is, currently, a popular area. Until comparatively recent times, the importance of the Arctic, in the layman's mind, was shrouded by misconceptions. This was largely a result of lack of information concerning the area. However, since World War II, a growing appreciation of the value of the frozen North has been taking place.

The Arctic's chief products may be ice, frigid temperatures, and the six-month-long nights. However, its major export is information. Meteorologically speaking, all the weather of the northern hemisphere originates there, and the U.S. maintains several weather stations in the Arctic in recognition of the fact. Strategically speaking, the Arctic is not as large as the Mercator projections would have us believe. Polar projections reveal that the North American continent borders quite closely on the Eurasian land mass. The military value of this fact has only recently been recognized. With the recent inception of commercial transpolar air flights on a schedule basis, the "opening" of the Arctic becomes a fact.

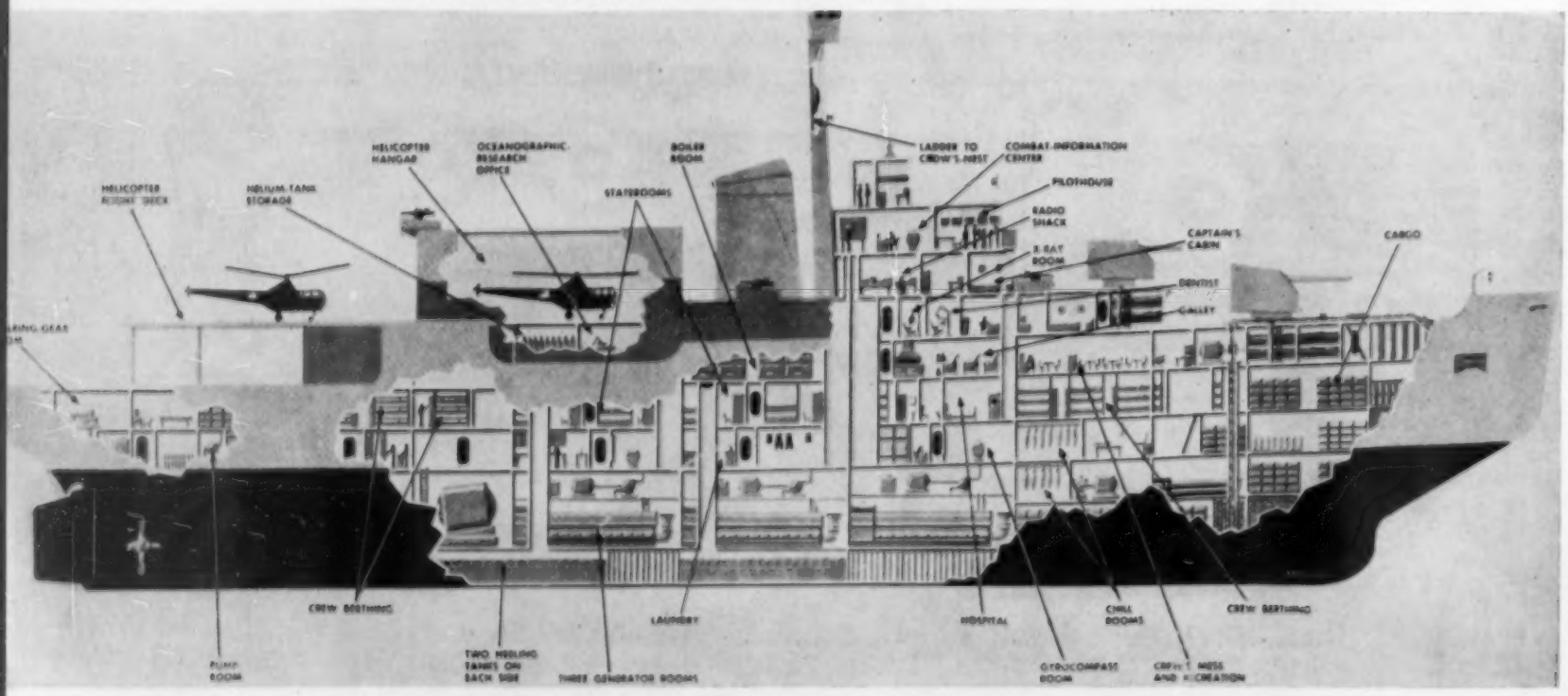
Despite its apparent bleakness, the North is not impossibly ice-bound nor is the six-month-long night as dark as one might think. Bases, both meteorological and military, already have been set up and more are being planned. Naturally, the matter of the necessary power supply was solved by employing diesels. The existence of those installations depends squarely upon their dependable power.

The bringing in of supplies, too, depends on diesel engines. While airplanes, naturally, play a large role in maintaining communications, the key to the full exploitation of the Arctic's potentialities lies in the ability to open up shipping lanes through the ice so cargo vessels can bring in the required huge quantities of supplies.

The U.S. Navy has recognized this fact and has been engaged in an ice-breaker building program. The Navy has five ice-breakers in operation. Four are of the earlier *Wind* class. Each is 269 ft. long, displaces 5500 tons and has six diesel engines which drive two 5000 horsepower motors. The latest ice-breaker to be launched was the *USS Glacier,* built by Ingalls Shipbuilding Corp., at its Pascagoula, Miss., yard last summer. This ship is 309 ft. long, has a beam of 74 ft., and has a full load displacement of 8625 tons.

The propulsion system, built by Westinghouse Electric Corp. and Fairbanks, Morse & Co., consists of two 10,500 hp motors, each 15 ft. in diameter and each weighing 108 tons. Power for the motors is supplied by 10 generators, each driven by a 12-cylinder Fairbanks-Morse opposed-piston diesel and each rated 2400 hp. The vessel also carries four 300 kw F-M opposed-piston diesel auxiliary generating sets and one 200 kw emergency diesel generating set. Each of the main engines is equipped with Navy shunt-type Briggs lube oil filters containing four relief valves, eight Navy Standard refills, and 4-in. Navy flanged inlet and outlet connections.

Cutaway drawing of the *USS Glacier*, the Navy's newest and largest ice-breaker.



WHAT'S GOING ON IN ENGLAND

CONDUCTED BY **HAMISH FERGUSON**

Hamish Ferguson received his training and early experience with the English Electric Company. Subsequently, he spent a number of years with a firm of diesel engine consultants, London, and in 1944 became secretary to the Diesel Engine Users Association. In 1955, he relinquished his appointment to devote his time to private consulting work connected with diesels and gas turbines.

MODERNIZING THE BRITISH RAILWAYS

DURING the first hundred years in the story of the railways of Great Britain, the only type of motive power used was steam. True, at the end of the last century and early in this one, a few original, small locomotives using internal combustion engines were developed, but these were of an experimental nature and never came into general use. Then, in the 1930's the diesel-electric locomotive was accepted for some shunting purposes. All main lines, however, continued to use steam locomotives which were also first-favorite for the branch and suburban lines. In the latter case, though a certain degree of electrification had been introduced using electric locomotives. Today, there are less than a dozen main line diesel and gas turbine locomotives in regular service, and, until this year, the steam engine was still accepted as the orthodox traction unit.

With the publication of the British Transport Commission's Report entitled "Modernization and Re-equipment of British Railways," the outlook has completely changed. The highlight of the report is the recommendation that the introduction of new locomotives employing steam shall cease entirely as from 1956. The remainder of the report outlines the modernization of the railway system necessary to conform to this fundamental change.

The plan is designed to cover a period of 15 years at an estimated cost of £1240 millions, made up as follows:—

	MILLIONS
1. Improved track, signalling, bridges, etc., to allow for main line speeds up to 100 mph	£210
2. Replacement of steam locomotives by diesel and electric traction.	£345
3. Modernization of passenger rolling stock, stations, etc.	£285
4. Modernization of freight rolling stock, marshalling yards, etc	£365
5. Research and development, modernization of offices and equipment, etc	£ 35
TOTAL	£1240

As the railway stands today, most of the suburban lines radiating from London, and also the main lines to the south east coast, already are electrified. In addition, some further electrification has been carried out in the Lancashire area. It is proposed to extend this in certain areas for main line traffic but while electrification is being carried out, automotive-type locomotives will be used. The locomotives envisaged for the future will include straight electric, diesel-electric, gas turbine-electric, diesel-mechanical, and diesel-hydraulic.

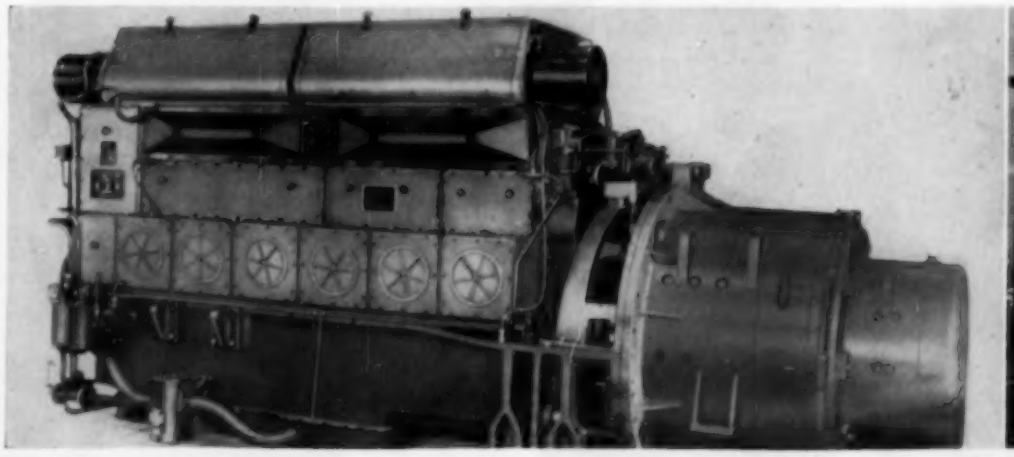
Distribution of new locomotives when the scheme is completed is likely to show the pattern in the table below.

Commenting on the various types of prime movers and drives which are likely to be used, the larger sized main line locomotives of about 2000 hp will probably be operated by multi-cylinder V-type, 4-cycle, pressure-charged engines or V-type loop-scavenge, 2-cycle engines, with electric drive. For locomotives up to 1000 hp, the engines may be of similar types, but, as an alternative to the electric drive, hydraulic couplings or mechanical gear-boxes may be employed. For railcars, the horizontal engine is likely to be widely adopted using a mechanical drive. Gas turbines will probably be developed for the largest locomotives and these would call for an electric drive.

As the scheme develops it will be interesting to observe the rate at which the gas turbine may catch up with the diesel, and also whether a nuclear-powered prime mover will be developed.

SERVICE	MAIN LINE	BRANCH LINE	SHUNTING
Traction Unit Types,	Diesel-Electric Diesel-Mechanical Gas Turbine-Electric	Diesel-Electric Diesel-Mechanical Railcar	Diesel-Electric Diesel-Mechanical
Power Output bhp.	1,000 to 2,000	up to 600	up to 600
Quantity	2,500	4,600	1,200
Cost	£125 millions	£35 millions	£25 millions

The JT6 diesel-electric traction unit developing 420 bhp at 750 rpm. It is built by Mirrlees Bickerton & Day Ltd.



The British Railways B.U.T. powered railcar on an experimental run.

Equipped with vee-type snow plows, Tournatractors have proved to be effective in keeping highways cleared of snow drifts.

When equipped with a rubber-tired logging arch, the 208-hp LeTourneau-Westinghouse Tournatractor is used for skidding logs to landings.

TOURNATRACTOR IS VERSATILE

THE dieselized Tournatractor, making its bow in 1947, was introduced as the "first machine of its kind in the heavy equipment industry." A revolutionary machine, it brought such features as rubber tires and constant mesh transmission to the big tractor field. But, that was eight years ago. What about the Tournatractor of 1955?

According to LeTourneau-Westinghouse Co., Peoria, Illinois, although the Tournatractor's appearance remains basically the same, it is a machine which has been constantly improved since it was first introduced. Topping a list of design improvements on the 1955 version is a more powerful diesel engine. It is the six-cylinder, two-cycle GM 6-71 which develops 208 bhp at 2000 rpm. Also offered as optional power plants are the Cummins HBIS-600 and the Buda 6 DA-844. Both of these six-cylinder, four-cycle diesels develop 200 hp at 1800 rpm.

A partial list of other improvements includes a double hand throttle which permits the machine's operator to control engine speed with either hand. To protect the engine when not operating, a rain cap on the exhaust stack keeps water from running into the manifold. Quieter operation is achieved by equipping the machine with an improved and more efficient Nelson muffler. In the compressed air system, a larger, stronger fabricated steel air tank provides greater air capacity, an important safety factor, the manufacturer points out.

The transmission, controlled by a simplified air shifting arrangement, also embodies an increase in oil capacity resulting in cooler operation, better lubrication and longer life. For ease of operation and increased efficiency, lever-type steering is used. This system handles in a manner similar to conventional tractors. Better brake control is achieved by use of quick-release valves on all wheel brakes, eliminating drag encountered when air does not exhaust fast enough. Wheel brakes and wheels on the Tournatractor now are interchangeable with the C Tournapull line. This advance is especially important under emergency conditions.

A wide variety of jobs can be handled by the 1955 Tournatractor through use of the full line of attachments, including: Bulldozer and angledozer blades, scrapers, vee-type snow plow, logging winch, root rake, a stinger for tree removal, bumper and pushblocks and power control units.

Here the tractor hauls sugar cane to the mill. Purchasers are offered the option of GMC, Cummins or Buda diesels when buying the Tournatractor.

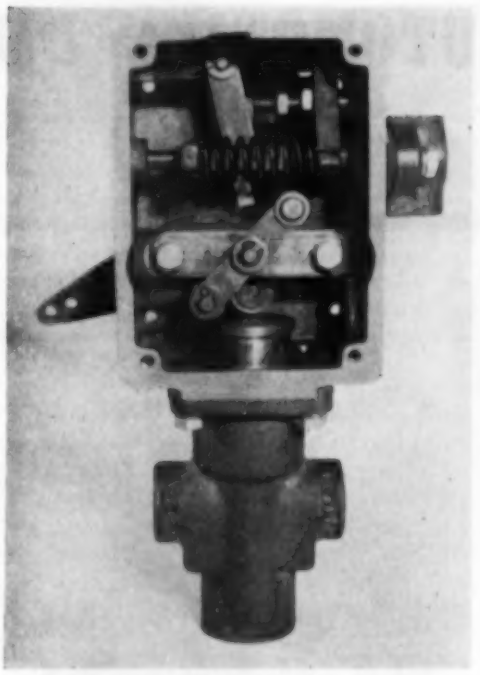
Fitted out with a "stinger," this tractor is being used in tree removal. Other uses include land leveling, coal handling, grading, and charging shovels in rock quarries.

NEW SELF-POWERED SAFETY CONTROL ANNOUNCED BY AMOT

A new Amot product for engine safety has just been announced by Amot Controls Corporation. It is their Model 1476-47 safety control for diesel and natural gas engines. The control which is self-powered, will shut off the fuel supply on diesel engines, thus shutting down the engine, on high jacket water temperature or low oil pressure. When installed on natural gas engines, it will close an air- or gas-operated fuel gas shut-off valve on high jacket water temperature or low lubricating oil pressure. The control is also available with a microswitch as extra equipment for sounding an electrical alarm or for grounding magnetos when the unit is tripped.

One unique feature of the Amot safety control is its ability to use several temperature sensing units with a single shut-down valve. This means that temperature sensing units can be placed at strategic points such as in the jacket water line, lube oil line, compressor jacket water line; and high temperature in any of these lines will trip the safety control and shut off the engine.

There are no special capillary tubes and all connections may be made with standard copper tubing. Therefore, if necessary, repairs can be made on the job. The temperature sensing unit uses the standard Amot wax-type element. To start an engine, the reset lever on the side of the main housing is raised to the "start" position and is held there until the engine has started and the lubricating oil pressure has built up to normal. The reset lever is then allowed to return to the "run" position. The control is available without the shut-down valve and with a lever substituted for it. This type of unit is used when it is desired to shut down the engine



View of the tripping mechanism in the Amot Safety Control. A sealed ball bearing is used on the roller for low friction.

by moving the injection pump control rack on high water temperature or low oil pressure, instead of shutting down the engine by means of shutting off the fuel supply.

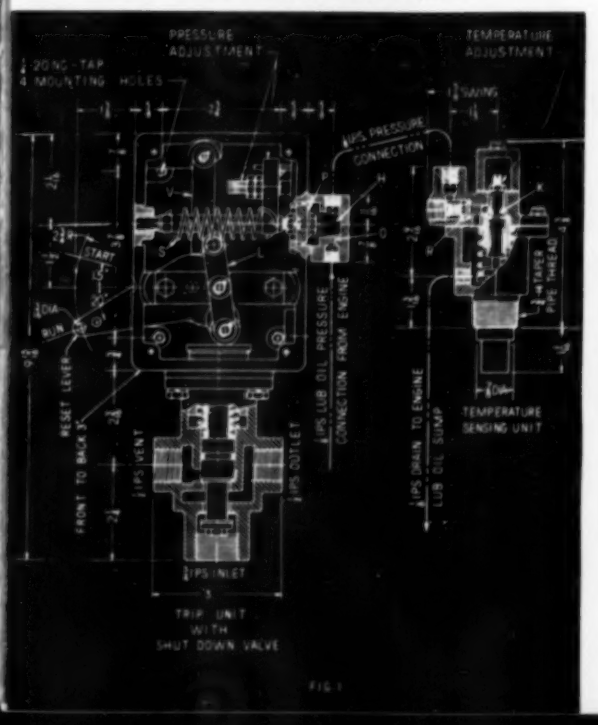
Fig. 2 is a diagram showing how to install the control on a diesel engine. The shut-down valve is installed in the fuel line between the transfer pump and the fuel injection pump. When the unit is tripped by high water temperature or low lube oil pressure, the shutdown valve shuts off the fuel from the transfer pump, and vents the inlet to the injection pump.

Fig. 3 is a diagram showing how to install the control on a natural gas engine. In this application, the control is used in conjuction with a spring-loaded diaphragm valve. The diaphragm valve is installed in the gas supply line, and the shut-down valve of the safety control supplies air pressure to the diaphragm valve to keep it open. When high water temperature or low lubricating oil pressure trips the shutdown valve, it shuts off the air supply and vents the diaphragm valve to atmosphere. The diaphragm valve then closes under the action of its spring and shuts off the gas supply. A microswitch can be supplied if desired, to ground the magnetos at the same time the shutoff valve is tripped.

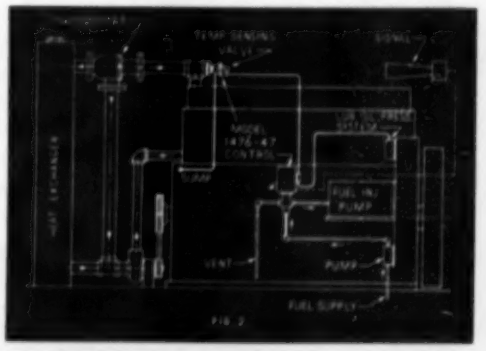
An interesting application for the control is for an air whistle alarm for high water temperature or low oil pressure. In many instances, electricity may not be available for an alarm system, or an electrical alarm may not be desired. On some marine installations, it is desirable to sound a loud air horn which cannot be ignored, on high water temperature or low oil pressure. In such cases, the control can be used to sound an air whistle or air horn when tripped. Engine starting air can be used for this purpose. The normal "inlet" to the shut-down valve is plugged, and the air is supplied to the port marked "outlet." The air whistle is connected to port marked "vent."

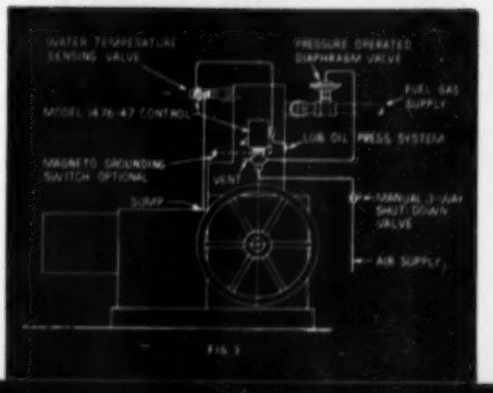
In Fig. 1 the trip mechanism is shown in the "run" position. Valve R of the temperature sensing unit is closed, and over-center linkage L holds the vent port closed and the inlet-to-outlet passage open in the shut-down valve. In this position, the lube oil pressure holds piston P against its limit of travel to the left and this limits the swing of vertical link V which forms the stop for over-center linkage L. When the lube oil pressure falls below the set pressure, spring S moves piston P to the limit of its travel to the right. This swings vertical link V and the upper end of over-center linkage L to the right also; the plunger of the shut-down valve is released and moves upwards, closing the inlet and venting the outlet port. When the temperature exceeds the set point, plunger K in the temperature sensing unit moves upward, forcing the steel ball to the left, unseating valve R. This releases the lube oil from housing H faster than it can be replaced through orifice O, immediately dropping the pressure below the set point and tripping the shut-down valve. The control unit will withstand a maximum lube oil pressure of 250 lb. per sq. in. The maximum continuous oil pressure is 125 lb. per sq. in. The safety control is further described in Bulletin #223 available from Amot Controls Corp., Richmond, Calif.

Several temperature-sensing units can be connected into the system to trip the shut-down valve on high temperature at any point in the system.



Top diagram shows how to install Amot Safety Control on a diesel engine. Bottom diagram pertains to a natural gas engine.





AUTOMOTIVE DIESEL PROGRESS

A COMMENTARY BY **MERRILL C. HORINE**

Merrill C. Horine, for 38 years a member of the Society of Automotive Engineers, has been actively engaged in automotive engineering, sales promotion and training, advertising and editing of automotive publications since 1907. He has contributed numerous papers on diesel and allied subjects to the SAE and other organizations. An officer in the Air Service in World War I, he was a consultant to the Chief of Ordnance and the Automotive Division of the War Production Board in World War II.

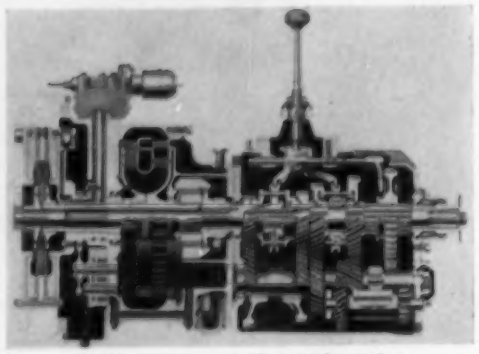
RETARDERS

RETARDERS, that relieve the vehicle brakes of a part of the work of slowing down or holding back on downgrades, are by no means new. They have long been used on electric locomotives, the electric driving motors being so connected that they can be made to act as generators, either bucking current back into the line or into resistors whereby it is converted to heat and dissipated to the atmosphere. Hydraulic retarders, as originally developed for mine hoists, have had extensive application to trucks, particularly in logging.

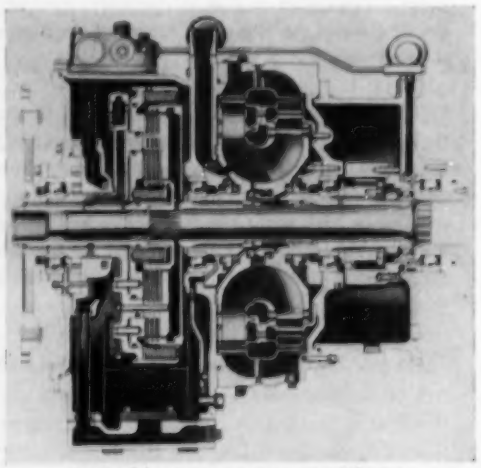
Some experimental work has been done with eddy-current generators, connected with the truck or tractor driveshaft and with trailer axles through the use of what would ordinarily be a driving axle and propeller shaft. Lately there have been three other developments of interest. One of these is the revival of the old principle, pioneered by the Saurer truck in Switzerland, in which, by means of a sliding camshaft, the timing of the engine valves was changed so that the engine acted as an air compressor, thus absorbing considerably more of the vehicle's kinetic energy or momentum than the normal compression of the engine.

Another development, proposed first in the early twenties, is a valve on the exhaust manifold which could be closed when decelerating, thus creating back-pressure for the same purpose. Latest of these developments is the adaptation of the hydraulic torque converter as a retarder. As used in passenger car and light truck transmissions, the turbine is always connected with the vehicle drive when the transmission is in driving position. In coasting or drifting, therefore, the vehicle will turn the turbine, which will then function as an impeller, causing the impeller, in turn, to change places and become the turbine.

The amount of retardation thus obtained is not large, however, because the angle and curvature of the blading is not favorable to this reversal of the fluid circuit. In conventional multi-stage converters, as used in bus and heavy truck application, there is an over-running clutch between the turbine element as the output drive, so that the converter is unable to absorb any power from the vehicle's momentum. Unless special means are used, therefore, such a converter permits free-wheeling.

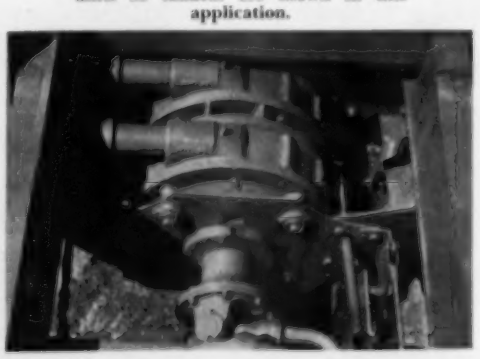


Double clutches provide retarder action (left) in torque converter of Spicer-Synchro-Verter.



Twin Disc torque converter with two concentric clutches provides retarder action.

Parkersburg Hydrotarder uses engine cooling water as operating fluid. Two units in tandem are shown in this application.



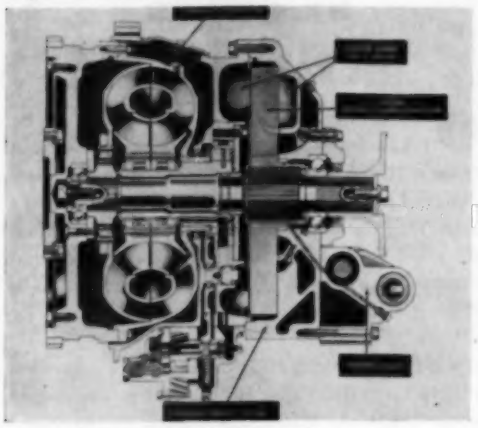
To prevent this, Spicer torque converters are provided with a direct-drive clutch, which, if engaged, locks the drive to the engine, so that full engine retardation is obtained, as in a conventional drive, in high gear. In some types, in addition, Spicer provides an over-running clutch which causes the vehicle to drive the engine, even when the direct-drive clutch is not engaged.

In a more recent development, the Spicer Synchro-Verter, there is an arrangement of controls so that both the direct-drive clutch and the converter impeller clutch can be engaged simultaneously, thus adding a certain amount of retarding action, additional to the engine from converter action.

Twin Disc endows its torque converters with retard-effect in a different manner. In one type there is an over-running clutch between the engine clutch shaft, which is permanently connected with the impeller, and the turbine element. This permits the engine to over-run the drive; but prevents the drive over-running the engine. Thus in coasting or drifting, the full engine retardation is obtained and in addition, the impeller and turbines operate in opposition to each other, thus absorbing additional power. Another Twin Disc arrangement employs two friction clutches whereby the engine may be connected with the impeller for converter drive; with the output shaft for direct drive; or with both at once for retardation.

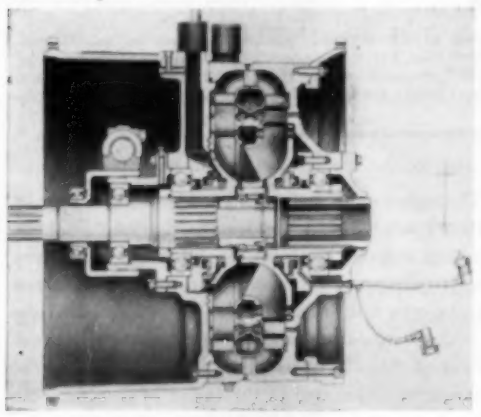
Allison has developed a turbine-type hydraulic retarder which is separate from the torque converter; but using the working fluid in common. Considerations of both safety and economy commend retarders to serious attention, both in the off-highway and over-the-road hauling fields. All of those discussed above, except the eddy-current type and air-cooled passenger car converters depend ultimately upon the engine cooling system to dissipate the energy absorbed in retardation. This is an additional advantage to some extent,

because it serves to prevent over-cooling of the engine on long descents.



A cutaway view of the Allison Torqmatic converter with the new Allison Torqmatic brake showing simplicity of construction and compactness of design.

However, this dependence upon the engine cooling system also limits the maximum effectiveness of the retarder, since its maximum continuous rate of power absorption will equal the cooling capacity of the engine cooling system. Thus, too much should not be expected. Retarders are not brakes. They lose effectiveness as the speed decreases and are wholly inadequate to absorb the tremendous amount of kinetic energy necessary to bring a vehicle to a standstill from ordinary road speed within required distances.



Twin Disc torque converter for heavy off-highway work employs over-running clutch between input and output shafts to contribute retardation.

Retarders can assist the friction brakes, however, and contribute continuous power absorption as in long descents, far beyond the ability of the wheel brakes. This is their principal mission. Their greatest virtue is their capacity for sustained application. Friction brakes, on the other hand, greatly exceed the capacity of retarders to absorb large inputs of energy in a short time; but their continuous cooling capacity is limited, so that on long, sustained application, the heat builds up, causing fade and even destructive burning of the lining and cracking and spalling of the drums.

Retarders within their capacity, are capable of continuous functioning practically indefinitely. They are thus able to greatly extend the life of the brakes and guard against their sudden failure. Because they do involve some extra weight and considerable extra investment, however, they have so far been in demand, principally, only where long, steep downgrades are characteristic of the operation.

Marquette President

Herbert Gleitz, president of The Marquette Metal Products Co., Cleveland, retired April 1 after 35 years with the firm which he founded in 1920. He built Marquette into one of America's largest and best known companies in the field of precision machining. Mr. Gleitz is succeeded by Fred E. Harrell, who occupied the post of general manager. Mr. Harrell has a broad background in the manufacturing industry. For 30 years he was connected with Reliance Electric and Engineering Co., Cleveland, where he served successively in sales, engineering and manufacturing. He recently resigned as vice-president and director of this company.

The Marquette Metal Products Co. has long specialized in producing precision parts and assemblies for the aircraft, automotive diesel engine and other industries. Prior to World War II the company started on a program of designing and marketing a varied line of products under the Marquette name, manufacturing among other products, hydraulic governors and over-speed trips for diesel and gas engines.

F-M Sales Organization Changes

John C. Elmburg

W. F. Wahlenmaier

J. A. Cuneo, vice president—Sales, Fairbanks, Morse & Co., Chicago manufacturers, has announced the appointment of John C. Elmburg, formerly manager of the company's Portland, Oregon Branch, as assistant general sales manager effective July 1st. Mr. Elmburg is well qualified for his new position as he has, during the past twenty-six years with the company, served as technical assistant, field engineer, department manager and manager of the firm's Boston, Atlanta and Portland branches. He succeeds Harry L. Hilleary who is to retire June 30th. Mr. Hilleary joined Fairbanks, Morse & Co. in 1920. During his thirty-five years he served as field engineer, eastern sales manager, Railroad Division, branch manager at St. Louis, and in recent years assistant general sales manager with headquarters in Chicago.

Mr. Elmburg is succeeded by William F. Wahlenmaier as Portland branch manager who joined the company in 1939 as a technical assistant in the Pump and Electrical Department of that sales office. Since 1954 he has been Electrical Department manager, which position he held until his recent advancement.

STANDARD OF THE INDUSTRY SINCE 1936

AND NOW! EVEN BETTER THAN EVER!

Luber-finer

New Revolutionary Models 500-C and 750-C

Fully Covered by issued & pending U. S. A. and Foreign Patents

IT'S WHAT'S INSIDE THAT COUNTS

The efficiency of Luber-finer's Patented Process Pack has never been equalled!

Save Time and Money with Luber-finer's FASTER SIMPLIFIED Pack Replacement

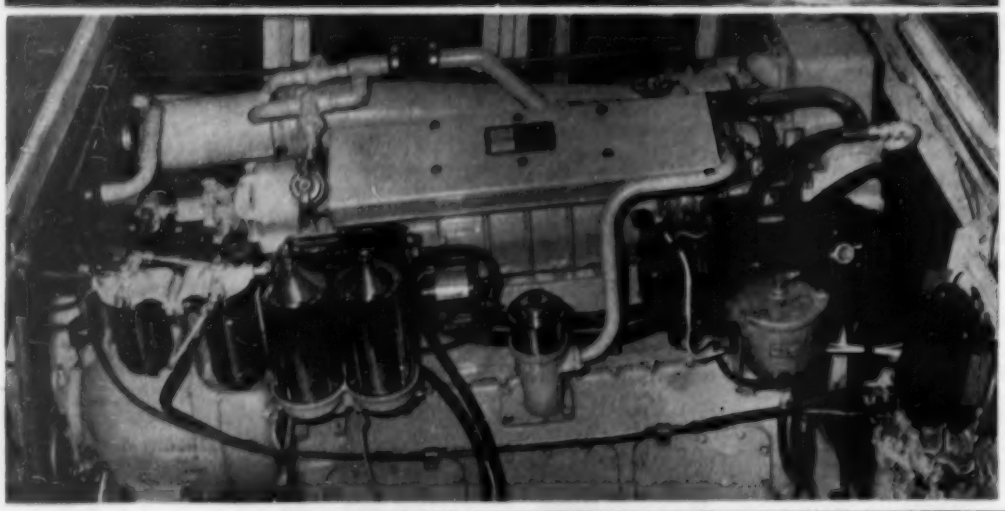
Luber-finer Exclusive Features:

- **Single Bolt Closure**—Ingeniously designed Clamping Ring utilizes Single Bolt Closure for quick, easy Pack Replacement.
- **Positive Sealing Gasket**—Long lasting "O" ring type gasket assures leak-proof lid closure at all operating pressures.
- **New Type Internal Design and Construction**—Provides multiple seal to eliminate the possibility of oil bypassing the Luber-finer pack.
- **Dual Safety Valves**—Prevents oil drainback, assuring exact crank case oil level reading at all times, stops oil from circulating through unit if lines are reversed or if Luber-finer is otherwise improperly installed.
- **One-Piece Extruded Steel Housing**—Plus rugged mounting brackets insures durability and long, trouble-free operation.
- **Time-Tested Patented Filtering Process**—*Only* in genuine LUBER-FINER PACKS—the exclusive patented filtering process proved by millions of satisfied users.

For Complete Information write Dept. 390

LUBER-FINER, Inc.

2514 S. Grand Ave., Los Angeles 7



"MARNA" DESIGNED BY OWNER

By Ed Dennis

ONE of the newest and finest yachts to be found on the South Florida coast is Nate Hunt's *Marna*. It is an air-conditioned 54-footer, designed by Mr. Hunt himself, and built at Chris's Boat Yard on the Miami River. At the launching, the guests' popped eyes at the amazing gadgets and luxuries aboard. Nate Hunt is an inventer and calls it his push-button yacht.

Twin General Motors 6-71 diesels, with a maximum of 216 hp at 2100 rpm, are located in the engine room below the salon. The diesels are equipped with GM 1.5:1 hydraulic reverse and reduction gears, giving the *Marna* a speed of 15.3 mph. A Mercedes-Benz diesel drives a 10 kw Onan generator which supplies power for the Copeland air-conditioning, compressor and auxiliary power.

The craftmanship and engineering that have gone into this new yacht makes her one of the finest vessels afloat. Her seagoing ability along with the modern diesel engines, is in keeping with Mr. Hunt's desire to have a vessel in which he will be able to cruise extensively in the utmost of comfort and safety.

One of the GM 6-71 inclined diesels on the *Marna*. Note the Perry filter-conditioner mounted in front of the generator at the right. The engine was supplied by Florida Diesel Engine Sales GM Corp. at its Miami branch.

ALLIS-CHALMERS PRESIDENT

Robert S. Stevenson has been elected president of Allis-Chalmers Manufacturing Company, Milwaukee, Wis., by the board of directors to succeed the late William A. Roberts who died April 12. Mr. Stevenson has been executive vice president of the company since July, 1952.

He started with Allis-Chalmers in 1933 as a salesman in the Tractor Division at the Kansas City, Mo., branch. Two years later he was appointed assistant manager of the Omaha, Neb., branch and in 1936 was transferred to the company's home office in Milwaukee. During the next 12 years he served as an assistant territory manager and as manager of the Northwest and Southwest territories. He was appointed assistant general sales manager for the Tractor Division in 1948, and general sales manager in 1950. He was appointed vice president in charge of the Tractor Division in February, 1951. Later that year Mr. Stevenson was elected to the Allis-Chalmers board of directors.

Robert S. Stevenson

Throughout this period his work brought him in close touch with the Tractor Division's field organization and its dealers. He also had important responsibilities in introducing new products in the company's line of construction equipment. In July, 1952, Stevenson was appointed executive vice president of Allis-Chalmers. He is also a member of the executive committee of the board of directors. He headed a group of Allis-Chalmers executives who visited Europe in the early months of 1953. He spent some time at the manufacturing headquarters of Allis-Chalmers Great Britain Limited, a company subsidiary at Essendine, England, and at the Paris office of the Tractor and General Machinery Divisions. He also visited some of the larger manufacturers in England, France and Holland.

He represented the company before the Joint Committee on Atomic Energy of Congress in July, 1953, and presented a statement advocating amendment to the Atomic Energy Act of 1946.

WATER TAXI

Equitable Equipment Co. Inc. announces its latest addition to its popular line of standard taxis, the new "Equity" 32' all steel diesel water taxi. This 32 ft. Crew Boat, as it is commonly called by many operators supplements Equitable's present line of Standard made Crew Boats which will now include 23 ft., 32 ft., 38 ft. and 51 ft. water taxis. With this complete line Equitable can adequately fulfill the needs of the oil industry and any other

personnel boat operators. The new 32 footer is constructed of an all steel hull and cabin and can be furnished with either gasoline or diesel engine in either the single or twin screw types. It has speeds ranging from 15 miles per hour to 35 miles per hour, depending upon the power and type desired.

Its dimensions are: length over all 32'0"; breadth 10'6"; depth molded 5'0".

ALCO POWER PACKAGE

THE first diesel packaged power plant introduced to the oil-drilling industry has been shipped from the Schenectady plant of Alco Products, Inc. Built for the Bateman Drilling Co., New Orleans, the diesel-electric power "package" has been shipped to Gretna, La., where it will be installed on an offshore oil-drilling barge.

This is the first new product delivered by Alco under its new name, adopted to emphasize the increasingly diversified nature of the company's operations. The 118-year-old corporation had been known as American Locomotive since eight prominent builders combined to form the locomotive manufacturing concern.

Consisting of two diesel engine generator sets—each made up of a diesel engine, two main generators and an auxiliary, a main control panel, two drawworks motors, two mud-pump motors, a driller's control stand and control cabinet, the new unit is the first standardized drilling-rig power plant engineered to operate under all conditions on land and sea. All components are skid mounted for easy portability and individual weights have been reduced to a minimum. Drawworks, mud pumps, and rotary tables can be operated singly or in combination and changing requirements can be met by making simple adjustments on the control panel. In addition, the unit is obtainable in diesel engine sizes ranging from 550 to 2400 hp and the package plant can drill depths of 5000 to 15,000 ft.

Other advantages of the Alco package power plant are that it is built of standardized units with immediately available replacement parts, is designed for servicing and maintenance accessability, and is easier to operate than a steam rig with the driller controlling the entire operation from a push-button control stand. The new power plant is designed to provide for faster drilling at a cost competitive with a regular power rig, enabling the operator to cut his drilling costs at the site.

CUMMINS ADVANCES FOUR

R. E. Huthsteiner, (left), president of Cummins Engine Company, Inc., Columbus, Indiana, congratulates four members of the company on their recent promotions. Mr. Huthsteiner is shown shaking hands with E. D. Tull, who is now executive vice president of the diesel manufacturing firm.

Watching are: R. B. Stoner, newly elected, vice president—Personnel; C. R. Boll, also newly elected vice president—Sales; and P. J. Every, who has been named general sales manager. These advancements were made following the annual meeting of Cummins shareholders in Columbus, Indiana.

WHITE MOTOR ACQUIRES ENGINE DIVISION OF NATIONAL SUPPLY

The White Motor Co., Cleveland, Ohio, a large producer of trucks and tractors, has acquired the Engine Division of the National Supply Company in Springfield, Ohio. The transfer of property facilitates the White Motor Co.'s entrance in the diesel engine industry through the well-established and modern facility known throughout the world as the producer of Superior and Atlas engines. These are two of the oldest names in the diesel engine industry.

Robert F. Black, president, White Motor Co., stated: "The acquisition is in keeping with White Motor's program of expanding into lines which are closely allied to its present field of operations."

Mr. Black announced the appointment of William F. Burrows as general manager of the White Diesel Engine Division. He also announced the appointment of William H. Johnson as division controller, and R. E. Lavery who will assist in the formulation of policies and procedures of the new division.

William F. Burrows

Mr. Burrows has been in charge of diesel engine development for the White Motor Co. for several years. White's Cleveland engineering facilities, under his direction, has been conducting a diesel engine research and development program for truck, industrial and marine applications. Now, from the new base in Springfield, the company intends to expand this work.

Mr. Burrows stated that his division is going into an aggressive selling campaign on Superior and Atlas engines for the petroleum, marine, stationary, municipal and industrial fields. The division is immediately expanding its efforts in field contacts and its sales and service organizations. The White Diesel Engine Division sales force will operate from the Springfield plant, and supervision and operation of other departments will be centered in that plant.

Inland River Reports

By A. D. Burroughs

EXCITEMENT REIGNED along the inland rivers over the record-breaking cargo pushed by Ashland Oil's *Aetna-Louisville*. With Capt. Campbell in charge, her 4800-hp GM 16-cyl. Model 279 A engines made five miles per hour upstream against a swollen Ohio with 8½ millions gallons of crude oil. Two weeks later, this powerful boat broke her own record with a 35,000-ton cargo of crude petroleum.

SWOLLEN RIVERS caused another unusual sight as the *Gene W.*, owned by J. L. Adams & Co., used power from her Caterpillar diesels (Model D13000) to rescue four huge metal storage tanks adrift in the Tennessee River. A rare task, a rough but successful trip, said Capts. Albert Wolfe and Mike Evans.

FEDERAL BARGE's *Tom Sawyer*, built in 1933 by Midland Barge Co. and equipped with McIntosh & Seymour diesels for a total 1180 hp at 300 rpm, made an impressive sight with her Federal tow on the Missouri.

OVER ON THE OHIO, the latest addition to the Crain Bros. fleet, the *Del Commune*, was downward bound with a barge of gasoline. Engineers A. W. West and Ernest Bangee reported excellent performance by her two Fairbanks-Morse 6-cyl. 2-cycle, solid injection diesels giving a total 1030 hp at 250 rpm. This one is a real worker, a true beauty, 160 ft. long with a long upper cabin.

CHIEF ENGINEER John Seller was in charge of the Cooper-Bessemer JS-6 diesels giving a total 760 hp at 310 rpm for the *Keystone*. A sister vessel to *Buckeye*, operated for Union Barge, she was downward bound with double lockage of five barges of steel, one oil, six empties.

FOLLOWING WITHIN a short time came another Union Barge vessel, the *Beaver*. Seen regularly around Clarington, she is equipped with Nelseco 350 hp diesel, and originally called *Dravo 42*.

WILLIAM T. WARNER, owned by Warner & Tamble, was downward bound making good time with four barges of steel. Built by her owners in 1933, she is a long-time favorite equipped with Winton diesels for 600 hp at 250 rpm.

AT PADUCAH, Ky., we noted with pleasure the nice job of piloting done by Capt. C. C. (Stuben) Foster with the *Inca* operating for Lea River Lines. She uses Superior diesels totaling 1800 hp.

THE *T. M. Norseworth*, owned by Houston Barge Lines, with a tow of gasoline, arrived at St. Louis from Freeport, Texas. Relief master, Capt. Elwood Haney, reported satisfaction on the fine performance from her GM 12-567 diesels, providing 1800 hp.

JOHN DAY WROTE: "We saw the MVBL's *Central* northward bound with reportedly 2400 tons of grain on the Keokuk." This five-year-old boat has given constant, dependable service, equipped with her Enterprise 8-cyl. 16x 20 diesels for 3000 hp at 290 rpm.

THE *Paulelah*, a nearly-new boat owned by Mid-West Navigation Inc., will use its power, 150 hp Cummins 6-cyl. diesel engine, to push the *Thunderbird*, the $50,000 non-self-propelled charter cruise boat now under construction by St. Louis Ship.

CAPT. TOM LUMM reports with pleasure on his new job as master of the *Marco*, now owned by MidWest Towing Company. An old favorite, built 16 years ago, she was originally named *Progress*. A fire a few years ago brought added modernization for continued service from her Cooper-Bessemer LT-8 diesels providing 2000 hp at 300 rpm.

THE VIDOS TOWING Company's new

Random Thoughts from a Filter Engineer

by J. K. Brixius

- **INSIDE JOB**
- **CUTTING DIESEL LOCOMOTIVE MAINTENANCE**
- **NEW SLANT ON BEATING THE ELEMENTS**

INSIDE JOB

It's generally agreed that engines and compressors work best when their intake air is cool and clean. This usually means putting the intake pipe outside the plant, probably a good distance off the ground. And installing a good filter on the end of the intake pipe. But this arrangement plays hob with filter servicing. The filter is hard to get at and apt to be neglected.

We solved this problem a few years back when we introduced our line of Air-Maze *in-line* filters. They're designed to fit anywhere between the intake and the engine or compressor. They can be located in the engine room where servicing is easy. And you can locate the end of the intake pipe wherever necessary to get the coolest, cleanest air, without creating a difficult servicing problem.

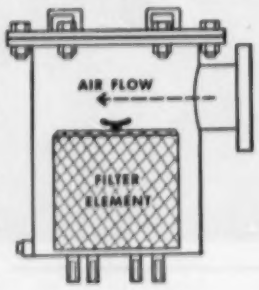


Diagram of in-line filter

Servicing an Air-Maze in-line filter is an inside job—and an easy one, too. We'll be glad to send you further information, or if you like, we'll be glad to make specific recommendations for your particular installation.

CUTTING DIESEL LOCOMOTIVE MAINTENANCE

Railroad men are talking more and more these days about cutting maintenance costs on diesel locomotives. When the talk is about filters, we should be careful to distinguish between *engine* maintenance and *filter* maintenance. A good filter should go long periods without attention, but not at the expense of filter efficiency. The reason you buy a filter in the first place is to protect your engine—to reduce engine maintenance. And it doesn't make sense to reduce filter maintenance at the expense of increased engine wear. (After all, if you didn't have a filter, you could eliminate all filter maintenance).

Typical Air-Maze oil bath installation

We think our Air-Maze oil bath air filters have the most to offer railroads because they do a good job of reducing *both* engine maintenance and filter maintenance. They go up to 24 times longer without servicing than panel type filters. And they clean the air more thoroughly than other filter types. Air is scrubbed clean in a bath of oil and an oil-washed screen traps any remaining dust, passing only clean, oil-free air. This thorough cleaning action not only lets Air-Maze oil bath air filters go for longer periods without servicing but, more important, provides the cleaner air which extends power assembly life of the locomotive, reduces down-time, lowers engine maintenance costs.

So when you think of maintenance, keep your eye on both engine *and* filter maintenance. Don't ignore the reason why you bought the filter in the first place—lower *engine* maintenance. We think the Air-Maze oil bath air filter is the ideal combination of minimum filter maintenance and maximum engine protection.

NEW SLANT ON BEATING THE ELEMENTS

Rain, snow and sleet make problems for filters as well as people. Of course, people can come in out of the rain, if they're smart enough. But filters can't. Take our Automaze self-cleaning air filter, for example. It's sometimes used on diesel air intakes, particularly where the volume of air to be handled is large and the air resistance must be kept low.

Automaze self-cleaning louvres

Because of the large face area of the Automaze the problem of weather is more severe. We think we've solved this by designing slanted louvres that give more protection than the straight up and down kind. They even have a reverse slant so they drain more quickly. Of course, there's no absolute protection when nature is at its worst. But these specially designed louvres do give maximum protection against normal weather hazards. The Air-Maze Corp., 25000 Miles Avenue, Cleveland 28, Ohio.

AFI MEMBER

AIR-MAZE

The Filter Engineers

AIR FILTERS • SILENCERS • SPARK ARRESTERS
LIQUID FILTERS • OIL SEPARATORS • GREASE FILTERS

tug, the *Michael*, has started service in the lower Mississippi for J. Ray McDermott and Co. She is powered by two 200-hp Buda diesels.

WE WERE PLEASED to catch a glimpse of J. L. Shirely Company's *Joealjim* delivering stock pile material on the upper Mississippi. Built by St. Louis Ship in '54, she measures 66x20x5 with Caterpillar diesels totaling 540 hp.

THE active *Laguna*, owned by Phillips Petroleum Company and seen regularly on inland rivers, has now been added to the Commercial Transport Corp. fleet of eight. Built in 1949 by Nashville Bridge Co., she is equipped with GM 12-cyl. diesels with a total 1800 hp.

BALDWIN-LIMA-HAMILTON diesel engines will provide a total of 5180 hp for the two new triple-screw sister towboats for the Ohio River Company. Built by St. Louis Ship, these vessels will measure 162x44 ft., similar in equipment and appearance to the *A. L. Long*, *A. H. Crane*, and the new *Mike Creditor*. The two new boats will be named and in active duty by early fall.

Name Officially Changed

Shareholders at the annual meeting of American Locomotive Company have approved a change in the name of the 118-year old concern to Alco Products, Incorporated. The new name has been adopted to reflect the company's increasingly diversified operations which have grown beyond its role as a leading locomotive supplier.

The company has been in continuous operation since 1837, when the Rogers Locomotive Works of Paterson, N. J. produced its first locomotive. This was the "Sandusky," a 4-2-0 wood-burning steamer which was equipped with only an open platform for an engineer's cab. Rogers was one of eight predecessor companies which combined to form American Locomotive in 1901.

While locomotive production will continue to be a major operation, Alco today manufacturers products for more than a dozen principal markets. Over three-quarter's of the company's 1954 output of regular products was in new lines. Last year alone Alco introduced 18 new products to its many customer industries and won a contract to build the Army's Package Power Reactor. This is the first atomic power plant designed so that its components can be transported anywhere in the world by air.

Three directors also were elected to the Alco board at the meeting. They are George W. H. Allen, vice president of Enos and Sanderson Company, Inc.,; Dr. Ernest W. Reid, president of Corn Products Refining Company, and Kenneth F. MacLellan, president of United Biscuit Company of America. Each will serve for a three-year term.

Miehle-Dexter Bulletin

A new six-page bulletin, showing the versatility of application for Miehle-Dexter blowers, has been issued by the Miehle-Dexter Supercharger Division, Dexter Folder Co., Racine, Wisconsin. Several new applications for blowers are illustrated and described. Of special note is the information describing new jet starting equipment used by the aircraft industry. In addition, the bulletin reviews the application of these blowers as superchargers and scavenging blowers.

A simple table and graphs are included in the folder, making it easy to determine the proper size unit to be used on various applications. This performance data shows blower pressures available to 15 psig or higher in stages. Vacuum to 15 inches hg. Capacities to 4000 cfm. The bulletin is available by writing the Miehle-Dexter Supercharger Division, Dexter Folder Co., Racine, Wisconsin, requesting Bulletin No. 255.

Young Heat Transfer News

YOUNG RADIATOR COMPANY, RACINE, WIS.

Cool, Ventilate and Heat Iowa Power Plant with Young Mono-Weld Radiators

Like a chameleon, Radiators are ready for just about any climate or condition you can imagine. They'll keep stationary or mobile engines cool in the Belgian Congo . . . or do a whale of a job at Little America.

Take a look at all the tools Radiators use to do a real cooling job . . . baffles, by-passes, thermostats, pressure caps, coolants. Then, there are fans, pumps, and proven core designs . . . and engineering experience.

Radiator cooling eliminates needless troubles. It does away with engine hot spots, excessive oil consumption, carbon deposits, burned valves and valve seats, stuck pistons and other engine failures experienced with other types of cooling systems.

Don't be fooled by the claims of other types of engine cooling systems. Remember, only Radiators can provide efficient engine cooling under every type of climate or condition.

WRITE FOR FREE YOUNG RADIATOR COMPANY *MONO-WELD* RADIATOR CATALOG

Mono-Weld Jacket Water Cooler features are completely illustrated and fully described. Capacity and accessory information is given for various models in the Young Radiator Company line. Address your request for Catalog No. 1651 to, Young Radiator Company, Dept 405-F, Racine, Wisconsin.

Young Jacket Water Coolers Utilize Waste Engine Heat

Sioux Center, Iowa, Municipal Power Plant has taken full advantage of two Young Radiator Company Jacket Water Coolers used to dissipate engine heat in a recently added Nordberg supercharged, 1060 hp., Diesel engine.

Young Jacket Water Coolers have been invaluable not only for rejecting engine heat up to 1,530,000 B.T.U. per hour, but also for utilizing this heat to reduce plant heating costs.

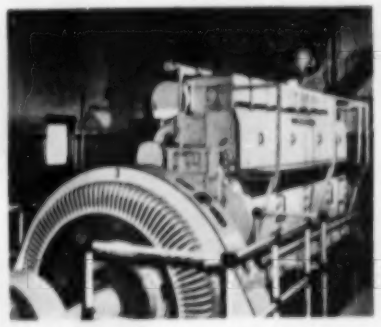
Located in the southwest corner of the building, which is equipped with louvres on the south, west and north walls, the Young Jacket Water Cooler shutters can be controlled to draw air through either one or both Coolers. Doors between engine and Cooler rooms may be opened or closed to draw either hot air out the engine room in summer for ventilation, or deliver hot air to the engine room during the winter heating months. A thermostatically controlled by-pass valve in the jacket water circuit of the engine maintains constant water temperature to the engine.

Young Radiator Company Jacket Water Coolers of rugged, *Mono-Weld* welded steel construction are available with water cooling capacities ranging from 500,000 to 2,300,000 B.T.U. per hour.

Accessories available for these Young Coolers include: fan motor; drive belts; sheaves; pump; oil-cooling coils; gas-cooling coils; manual or automatic (air, vacuum or electric) shutter controls; front core guard screen when shutters are not required; warm-up curtain used with screen; and surge tank.

For additional details write for free Young Radiator Company catalog offered in column at left.

View of Young Radiator Company *Mono-Weld* Radiator



Nordberg Diesel engine cooled by Young Radiator

Mono-Weld is a Young Radiator Company Trademark

Young RADIATOR COMPANY
RACINE, WISCONSIN
Creative HEAT TRANSFER ENGINEERS FOR INDUSTRY
Heat Transfer Products for Automotive, Aviation and Industrial Applications. Heating, Cooling, Air Conditioning Products for Home and Industry.
Executive Office: Racine, Wisconsin, Plants at Racine, Wisconsin, Mattoon, Illinois

New High-Low Frequency Exhaust Silencers

The patented and very successful snubbing principle of the Burgess-Manning intake and exhaust silencers has now been adapted to a new line of Acoustic Discharge Silencers.. This new type is designed to eliminate high and low frequency noises caused from gas, steam and air operated equipment. Acoustic reactance chambers employing special sound absorbing material are used in this new design. They will satisfy the needs in critical and non-critical areas.

These new Acoustic Discharge Silencers will mount on the exhaust of steam vents, gas turbines, hogging jets, evacuating ejectors, etc., and reduce the sharp, noise producing impulses of discharging gases to an even, constant noiseless flow.

A complete range of models will be offered in standard 8 to 30 inch pipe sizes.

Special sizes may be engineered to the specific application as exemplified by what is believed to be the world's largest snubber. This large snubber, designed to silence the exhaust of a 5000 kw simple cycle gas turbine generating unit at a mid-western utilities company, measured 74 ft by 12 ft in diameter.

Literature has been published on these new Acoustic Discharge Silencers and may be had by writing to Mr. H. A. Dietrich, Burgess-Manning Company, 749 East Park Avenue, Libertyville, Illinois.

Ingersoll-Rand Engine Bulletin

Ingersoll-Rand, one of the pioneers in the development of diesel engines since 1918, announces the release of a new 20 page bulletin describing features of their Type "S" and "SS" heavy duty diesel engines in sizes from 375 to 1000 hp.

This bulletin provides complete information about the lubrication, cooling and fuel injection systems of the engines. It furnishes details about engine housing design, full floating aluminum bearings, large diameter crankshaft, gear driven auxiliaries and other features. Included also are specification and dimension sections and a number of illustrations of the engines and component parts. The manufacturer claims exceptionally low fuel consumption for the "S" and "SS" engines through the use of diametrically opposed single orifice injector nozzles which provide solid fuel injection.

The new I-R Diesel Engine Bulletin, Form 10,040 may be obtained by writing Ingersoll-Rand, 11 Broadway, New York 4, N. Y. or from any Ingersoll-Rand branch office.

Crew Boat

Gulf Oil Company has just put a 28-foot Chris-Craft cruiser to work as a personnel and supervisors' boat in offshore drilling operations. The craft, powered by a single General Motors "4-71" inclined diesel engine, logged speeds up to 22.3 miles per hour in trial runs off Kemah, Texas. Her top speed is attained at 1900 engine rpm although the craft planes at 1625 engine rpm. The GM was installed by Stewart and Stevenson Services, of Houston.

Manager of Marketing

Gordon J. Berry, president, The Electric Products Company, 1725 Clarktone, Cleveland 12, Ohio, announces the appointment of G. J. Doss as manager of marketing. He will be responsible for the coordination of sales and promotion of all divisions of the company. Mr. Doss came to The Electric Products Company in 1946 as manager of the Cleveland district office and in 1951, was advanced to assistant sales manager. In 1953, he was appointed general manager of Electric Product's Switchboard and Control Division. He brings to his new position a broad experience in electrical sales and engineering.

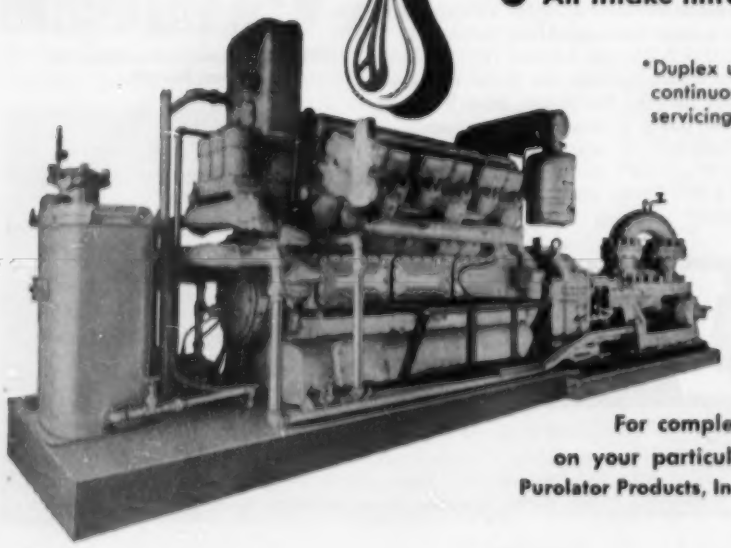
For positive filter protection . . .

CHECK THESE 5 POINTS WITH PUROLATOR

"FIRST in the field of filtering"

- **Full flow lubricant filtration**
- **Micronic filtration of fuel to the injector pump ***
- **Individual filter protection for each nozzle**
- **Metal edge filter to protect fuel transfer pump ***
- **Air intake filtration**

*Duplex units available for continuous operation while servicing filter elements.



For complete technical filter data on your particular diesel application, write to Purolator Products, Inc., Dept. DL1-610, Rahway, New Jersey.

New Engine Replaces Cat D13000

A new 6-cylinder diesel has been added to the Caterpillar Tractor Co.'s line to replace the D13000. The new Cat D342 is rated 190 hp @ 1200 rpm for intermittent duty. It is a 4-cycle, valve-in-head engine with 5¾-in. bore and 8-in. stroke, the piston displacement being 1246 cu. in.

The more compact design of the D342 presents a clean, easily maintained unit composed of many parts already standard in all of the company's 5¾-in. bore engines. Valves, valve springs, valve rotators, valve seat inserts, and piston assemblies fit a wide variety of Caterpillar engines. Other features include a larger capacity water pump; relocation of lines and tubes which have been placed inside the block for better appearance and inexpensive, capsule-type fuel injection valves. Three starting systems are available: air, direct electric, or gasoline.

Other details of the D342: the crankshaft is of high carbon steel with "Hi-Electro" hardened journals; the cylinder heads are of alloy cast iron with water directors and removable precombustion chambers; removable, wet-type cylinder liners; governor is Caterpillar-built, fly-ball-type, spring balanced; cooling system is closed-type, thermostatic water temperature control with gear-driven centrifugal pump; full pressure lubrication system includes gear-type pump and full-flow, disposable, paper filter element; pistons are aluminum alloy with cast iron top ring band and stainless steel heat plug.

The engine is designed to burn No. 2 fuel oil (ASTM spec. D396-48T). Its approximate net weight in dry pounds, 5500. Approximate overall dimensions are: length, 81 in., width, 42½ in., height, 62¼ in. (ITS NEW)

Montreal Locomotive Officers

Election of Percy M. Fox, J. G. Notman and Jules R. Timmins all of Montreal, and Wilson D. Leggett, Jr., of Schenectady, N.Y., as directors of Montreal Locomotive Works, Ltd., was announced following the adjoined annual meeting of shareholders recently. Directors reelected at the meeting were P. T. Egbert, chairman of the board, J. E. L. Duquet, W. G. Miller, W. S. Morris, W. J. Niles, Rhys M. Sale and Colin W. Webster.

Mr. Fox is president and director of St. Lawrence Corporation Ltd., and its subsidiaries.

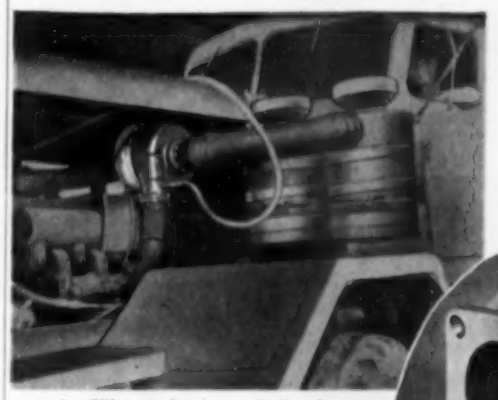
Mr. Notman is president and general manager of Canadair, Ltd.; senior vice president and director of General Dynamics Corp.; and director of Canadian Arsenals, Ltd., Canadian Car and Foundry Co., Ltd., and Canadian Marconi Co. Mr. Timmins is president of Hollinger Consolidated Gold Mines, Ltd.; Hollinger, Hanna, Ltd.; Hollinger North Shore Exploration Co. Ltd., Labrador Mining & Exploration Co. Ltd.; and several other companies.

Admiral Leggett is currently vice president of engineering of Alco Products, Inc. (formerly American Locomotive Company), MLW's parent company.

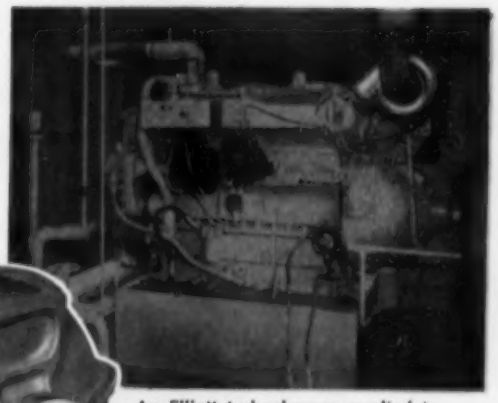
Changes Corporate Name

Shareholders of Socony-Vacuum Oil Company, Inc., voted at their annual meeting today to change the company's corporate name to Socony Mobil Oil Company, Inc. The new name, which became effective last month after the necessary papers were filed was approved by about 99 percent of the shares voted. The change was recommended by the board of directors, after extensive surveys, to link the corporate name more closely with the Mobil brand products the company sells. The old name was adopted after the merger in 1931 of the Standard Oil Company of New York (Socony) and the Vacuum Oil Company.

You can count on ELLIOTT turbocharging!

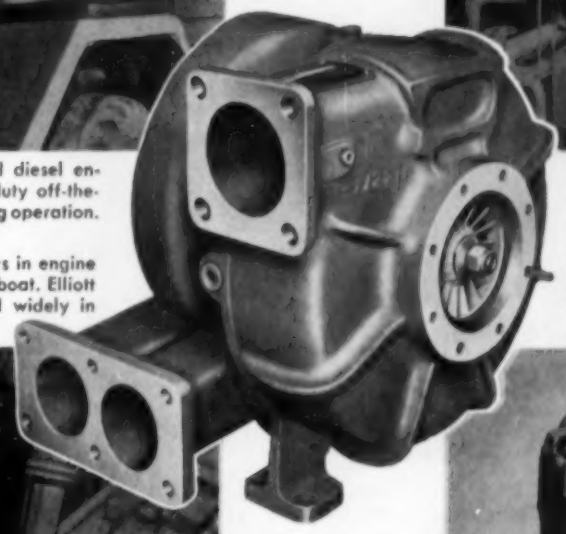


An Elliott turbocharged diesel engine used in a heavy-duty off-the-highway truck in a mining operation.

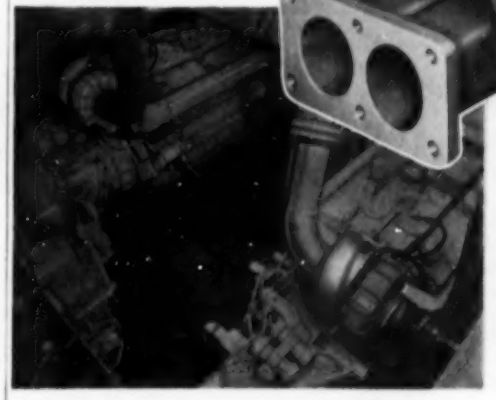


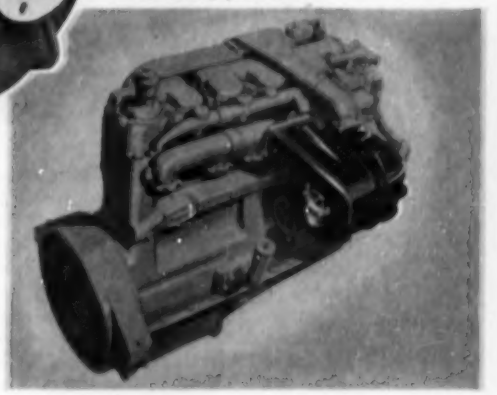
An Elliott turbocharger applied to a diesel engine in an industrial pumping installation.

Two Elliott turbochargers in engine room of a powerful towboat. Elliott turbochargers are used widely in marine service.



Elliott turbochargers also boost output of high-speed engines like this for truck, marine, locomotive and stationary plants.



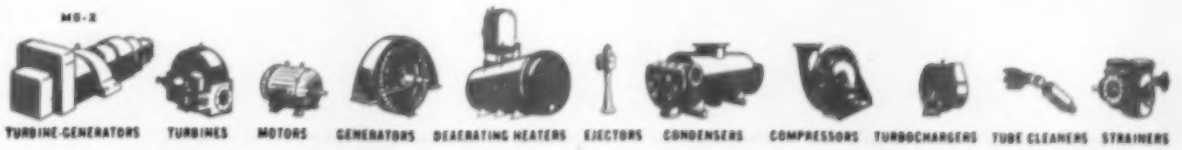


Back of today's Elliott turbochargers...

... are 15 years of design, manufacturing and application experience with over 12,000,000 hp of turbocharged engines! These turbochargers are piling up thousands of operating hours on the toughest kinds of service—on heavy-duty on-and-off-highway trucks, railroad locomotives, oil-well drilling rigs, drag lines, power shovels, marine and stationary installations. When your diesel engine is equipped with an Elliott turbocharger you can count on it to deliver the trouble-free performance and high operating standards required.

Get full information on Elliott exhaust-driven turbochargers for four-cycle or two-cycle engines. Specify them on your next engine, whatever the application. Elliott Company, Supercharger Dept., Jeannette, Pa.

ELLIOTT Company



"Big Bear" cuts log hauling costs by using heavy-duty truck-type TWIN DISC TORQUE CONVERTER

On mountain grades up to 25% . . . combined with long, flat runs over highways (both private and public) . . . Big Bear Timber Company of Redlands, Calif., is hauling logs *faster, safer,* and *cheaper* than ever before. Big Bear — a leading West Coast producer of Ponderosa and Jeffrey Pine, under supervision of President Dave Rogers—is making a name for itself in utilization of salvaged timber.

One of the keys to their profitable hauling is the Twin Disc Model DF Truck-Type Torque Converter, with up-to-6:1 torque multiplication, *built-in* Hydrodynamic Braking, and Lock-Out Drive (all Fingertip-Controlled). At Big Bear, the Model DF's are installed in four new Peterbilt 350 Logging Trucks with Cummins NHBS 275 hp Diesels — and three more identical units are on order.

Up steep, rock-studded grades, the trucks are climbing steadily without spinning out on the turns. On downgrades under load, the exclusive Twin Disc *built-in* Torque Converter Braking feature eases the load down smoothly, safely, *without* shock-loading transmissions. And on the long, flat stretches, the Lock-Out Drive feature permits maximum speed and economy by providing a direct mechanical drive.

Big Bear Timber Company is saving tires, brakes, drive line components, engines and *time*. You can realize similar performance and savings from *your* logging trucks, by specifying Twin Disc Truck-Type Torque Converters. *Write Twin Disc Clutch Company, Hydraulic Division, Rockford, Ill., today for complete information.*

TWIN DISC

TWIN DISC
Torque Converters

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin • HYDRAULIC DIVISION Rockford, Illinois

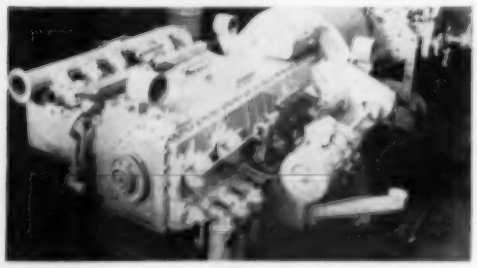
Branches or Sales Engineering Offices: Cleveland • Dallas • Detroit • Los Angeles • Newark • New Orleans • Seattle • Tulsa

European Diesel News

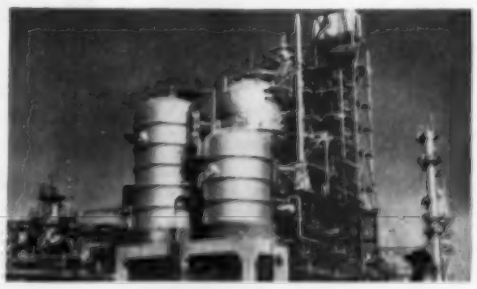
By Hamish Ferguson

F. PERKINS LTD. In their 23rd annual report covering 1954, F. Perkins, Ltd., Peterborough, announces new production records. The total output in terms of engine brake horsepower exceeded the four million mark and represented the manufacture of more than 60,000 individual engines of all types. The number of employees increased from less than 1000 in 1946 to over 5000 in 1954. Further extensions to the factory are nearing completion which will enable production to be stepped up to meet the world demand for the range of automotive, industrial, and marine diesels in which the company specializes.

MEADOWS DIESELS. Henry Meadows, Ltd., Wolverhampton, members of the Associated British Engineering Group, now is producing a comprehensive range of diesel, petrol, and natural gas engines from 15 to 270 bhp for industrial, automotive, and marine applications. All the diesels are of the 4-cycle, direct-injection type and, for the higher powers, pressure-charging has been adopted. Of special interest for railway work is the 6-HDT-970 engine which is of "flat" design suitable for underfloor mounting. This "square" engine with bore and stroke of 5.9 in. has a normal running speed of 1800 rpm and is rated at 165 bhp, naturally aspirated, or 240 bhp, pressure-charged.



INDIA'S NEW OIL REFINERY. The largest oil refinery in India, built near Bombay by Burmah-Shell Refineries, Ltd., at a cost of £23 million, has been completed a year ahead of schedule. Situated on Trombay Island, the refinery will process two million tons of crude oil a year, and its production of petrol, kerosene, diesel oils and furnace oils will be the highest in India.



BELGIAN RAILWAYS TO USE DIESELS. Though further electrification of the Belgian railway systems is to be carried out with a view to superseding steam locomotion, the extended use of diesel railcars is contemplated. Forty-two units have been completed and an additional forty are on order. The future balance between diesel and electric traction will be decided dependant upon service results.

LEYLAND DIESELS FOR WINNIPEG. The tramcar services along Portage Avenue and Main Street in Winnipeg are in process of being superseded by Leyland diesel-engined 52-seater Flexible-Twin transit buses. Twenty-five vehicles are already in service and the Greater Winnipeg Transit Commission now has ordered a further 50 from Twin Coach of Canada, Ltd. The buses are powered by Leyland 11.1 litre diesel engines which incorporate S.A.E. standard threads as well as American accessories and fittings.

FIAT INDUSTRIAL GAS TURBINES. Fiat, of Torino, Italy, who has already developed a small gas turbine for automotive purposes, is now working on larger-sized units for industrial and marine applications. A license agreement has been made with the Westinghouse Electric Corp., Philadelphia.

SERVICE CHIEFS VISIT MIRRLEES. As part of their course at the Imperial Defence College, seven distinguished government and services officers from the Commonwealth and the United States visited the works of Mirrlees, Bickerton & Day Ltd. at Stockport to inspect the large-scale production of heavy diesel engines. Mirrlees are completing a series of defense contracts for the Royal Navy by supplying 261 propulsion and auxiliary diesels for coastal mine-sweepers. The U.S. representative at the visit was Col. F. J. Sutterlin, USAF.

NAPIER DELTIC. The first of the coastal mine-sweepers to be powered by Napier "Deltic" light-weight diesel engines, H.M.S. *Highburton,* has been accepted by the Royal Navy from the builders, J. I. Thornycroft & Co. Ltd. of Southampton. The hull is 152 ft. long with a beam of 29 ft. and the construction incorporates the use of aluminum both for the framing and structural castings, the outer bottom being wood planked. Thus the hull is largely of non-magnetic material and a minimum of steel is used in the construction of the engines to provide a ship insensitive to magnetically-operated devices.

Sales Manager for Transmission Division

Roger W. Robinson

Roger W. Robinson has been appointed sales manager for Clark Equipment Company's Transmission Division, it was announced recently by C. H. King, Clark vice president. Mr. Robinson, who will make his headquarters at the company's transmission plant and will be responsible for sales of the complete line of Clark transmissions, torque converters and power train packaged units. With the company since 1941, he was previously company representative handling transmission and axle sales to earthmoving and agricultural equipment manufacturers.

Twin Disc Power Take-Offs are available with clutches ranging from 6.5" to 24" single-plate; from 11.5" to 24" double-plate. Housing sizes No. 6 SAE to No. 00 SAE. Capacities up to 600 hp. Write for Bulletin No. 129-C.

Next time you're watching powered equipment driving through a friction power take-off, check the name plate on the drive back of the engine. In all probability, you'll see a Twin Disc Power Take-Off, putting *more horsepower to work.* With their simple, *rugged* design—single-point adjustment—and slippage capacity far in *excess* of horsepower rating, *Twin Disc Power Take-Offs are selected as standard equipment by most of the nation's leading industrial engine manufacturers.*

That's why you'll find Twin Disc Power Take-Offs on such leading industrial engines as Ajax - Buda - Caterpillar - Climax - Continental - Cummins - Hercules - International - LeRoi - Minneapolis-Moline - Murphy - Superior - Waukesha - White - Wisconsin . . . for these manufacturers know they can depend on Twin Disc performance . . . and they know, too, that wherever their engines may be ultimately working, Twin Disc Service will only be a matter of hours . . . backed by 60 Parts Stations and 8 Factory Branches or Sales Eng. Offices.

TWIN DISC
Friction Clutches and Fluid Drives

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin • HYDRAULIC DIVISION, Rockford, Illinois

Branches or Sales Engineering Offices: Cleveland • Dallas • Detroit • Los Angeles • Newark • New Orleans • Seattle • Tulsa

Florida Diesel News

By Ed Dennis

COSTA RICA BOUND, the newly-launched 60-ft. *Peter Moore,* powered with a 4-cyl. Atlas Imperial diesel rated 86 hp at 450 rpm. A Petter diesel supplied power for the generator and air compressor. Her speed is nine knots and Capt. L. F. Moore is skipper.

A BUDA DIESEL ENGINE model 6-DASG-844 was recently installed with an Allis-Chalmers 150-kw generator for stand-by use in the City of Hollywood sewer disposal plant by Peninsular Armature Works.

RECENTLY LAUNCHED on Palm Springs Lake *Andy's No. 1* dredge. The main power plant is a General Motors 6-71 diesel with a Higgins 2.5:1 r&r gears to drive an 8-in. Maddox sand pump. A 4-cyl. Hercules diesel drives the 3-in. Gorman-Rupp pump for agitation. Three thousand yards of sand is being pumped daily.

THREE FAIRBANKS-MORSE model 49B4½ diesel generating sets, each rated at 75 kw, and one model 45B4⅛ 10½-hp diesel engine for use at pump station #82 are being built by Belcher Oil Co. at the Lake Okeechobee levee of the Florida Flood Control Project. These are in addition to the four 1280-hp Fairbanks-Morse pump engines.

AT FORT MYERS, Diesel Engine Sales, Inc., sold a model 3DSP232-R, 3-kw Onan diesel generating set to the Gasparella Fisheries of Placida.

FROM SHELLEY TRACTOR & Equipment of Miami a model 375 Caterpillar diesel generating set with a 210-kw Columbia generator for standby use at Holy Cross Hospital.

FOR HAVANA, Cuba, to be used in a rock crushing plant, a Nordberg model 4FS1 diesel engine rated at 10 hp from J. Frank Knorr, Miami.

ELLIS DIESEL SALES, Fort Lauderdale, sold the two 4-cyl. inclined General Motors diesels which were on display at the Miami Motor Boat Show. They were installed in the 42-ft. yacht *San-Ge,* owned by the Chicago Wire Craft Corp. Each is rated 154 hp at 2000 rpm, with GM 1.5:1 hydraulic gears. Speed is 23 mph.

DOCKSIDE AT THE Flamingo Hotel, Miami Beach, is the *Rhonda III* powered with two Superior diesels model 40-M3X-6 rated 425 hp at 650 rpm. (See complete story elsewhere in this issue.) Speeds up to 14 knots were recorded in the Gulf Stream.

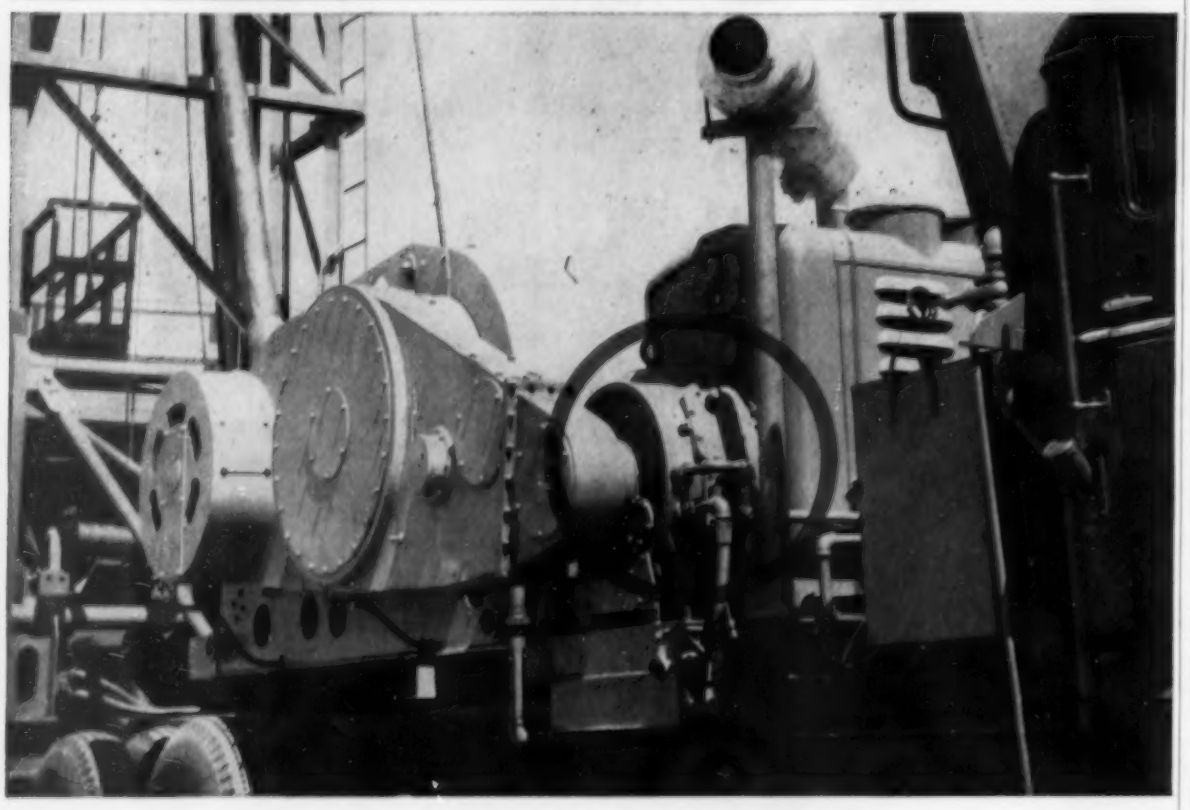
ANDY'S TRUCKING SERVICE in Hialeah recently took delivery of three 20-yd. bottom-dump Euclids powered with General Motors model 6-71 diesels, and a 2½-yd. Northwest dragline powered with a 190 hp Murphy diesel.

FLORIDA DIESEL Engine Sales reports that the *Trade Wind II,* powered with a pair of General Motors 4-51 diesels and Paragon clutch, was sold to John Rust, Miami.

AUTO MARINE ENGINEERS, Miami, sold a pair of model DIX6-EC Hercules 6-cyl. supercharged diesels, each rated 150 hp at 3000 rpm, for use in a yacht being overhauled at Merrill Stevens Shipyard.

AT ST. AUGUSTINE, Diesel Engine Sales launched the *Buccaneer* and *Daryl Wayne* both 67-ft. fishing trawlers. The *Buccaneer,* owned by Dougherty Bros., Fernandina Beach, is ppwered with a model 6-110 General Motors diesel and GM 4.5:1 r&r gears. The *Daryle Wayne* calls Tampa her home port and has a D13000 Caterpillar diesel. Both have Delco-Remy starters and generators and make 11 knots.

AT HOLLYWOOD, the Ronlee Corp.



More Production—lower costs
with TORCON'S steady, shockless power

By balancing engine efficiency and horsepower throughout a wide working range, Clark-Torcon torque converters are achieving top performance in every type of installation. The Clark-Torcon "Effective Multiplication Ratio" provides *torque to meet load requirements*—utilizes more of the horsepower more of the time.

Check These Basic Features of the Torcon Line

- **High efficiency over wide range**—produces more work and reduces wear on components.
- **Most accessible unit**—inspection plates easily accessible; no special tools needed for service.
- **Self-contained oil circuit**—sump is an integral part of unit. Oil passages cored in housing—no unnecessary fittings, hoses; no leakage, no external oil seals under pressure.
- **Individually cast single-piece elements**—no welds or fabrications to distort under extreme loads.
- **A complete line**—15 to 600 H.P.
- **Broadest line of options**—readily adaptable to a wide range of applications:

Excavator cranes • Grading machinery • Oil drilling rigs • Logging equipment • Heavy duty trucks and buses • Tractor Shovels

The Clark-Torcon is a standard "package" unit mass-produced with pump, sump, and pressure regulator integral. It is available off-the-shelf to engine and original equipment manufacturers, and to owners and operators. With its wide range of wheel diameters and choice of options, the Torcon unit can be fitted readily into your power-transmission system.

Check Torcon's important quality features; and send for an illustrated bulletin—use the coupon.

There's a Torcon to
FIT YOUR NEED
...send for this important bulletin

A brief, clear statement concerning torque multiplication, with illustrations showing the superior features of Clark-Torcon design. The coupon brings your copy—no obligation.

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with their three 12-yd. Tournapulls, each powered with a General Motors 6-71 diesel rated at 170 hp, and an Allis-Chalmers HD-20 diesel Tractomotive, are moving a mountain of dirt daily.

TWO FAIRBANKS-MORSE 10-cyl. 8½-x10 OP diesels power the dredge *Morgan*, presently operating on the Hillsboro Canal. Owned by the Gahagan Construction Co., it has a 24-in. discharge pipe.

Diesel Plant To Ease Power Shortage

Costa Rica is preparing now to ease a power shortage expected during next year's dry season with plans for one of the largest diesel-electric power plants in Latin America, said R. D. McManigal, vice president of Westinghouse Electric International Company, New York.

Nordberg Manufacturing Company, Milwaukee, prime contractor on the project, is building four diesel engines for a 16,500-kva generating station at San Jose to be completed late in 1955. Westinghouse is supplying the generators, transformers, controls and other electric apparatus. The project is being partially financed by a $1,023,000 Export-Import Bank credit granted last month.

"More than nine-tenths of Costa Rica's power is hydroelectric," Mr. McManigal said. "The new unit will assure a stable source of power when there is too little water to drive the turbines at full capacity. The country's dry season begins in January and lasts up to five months, cutting the power supply by as much as fifty percent."

One urgent use for the new installation will be to supply energy for the pumping of available river water for irrigation. When other generators are eventually added to the power system, the diesel-electric station will be especially useful in "peaking" operations during the heavy-load periods of early morning and evening.

The project is part of the program of the Institute Costarricense de Electricidad, a government agency, to develop about 60,000 kw of new facilities. Electrical energy from the plant will be distributed by the Compania Nacional de Fuerza y Luz, S. A., a private concern, which handles two-thirds of the country's commercial distribution.

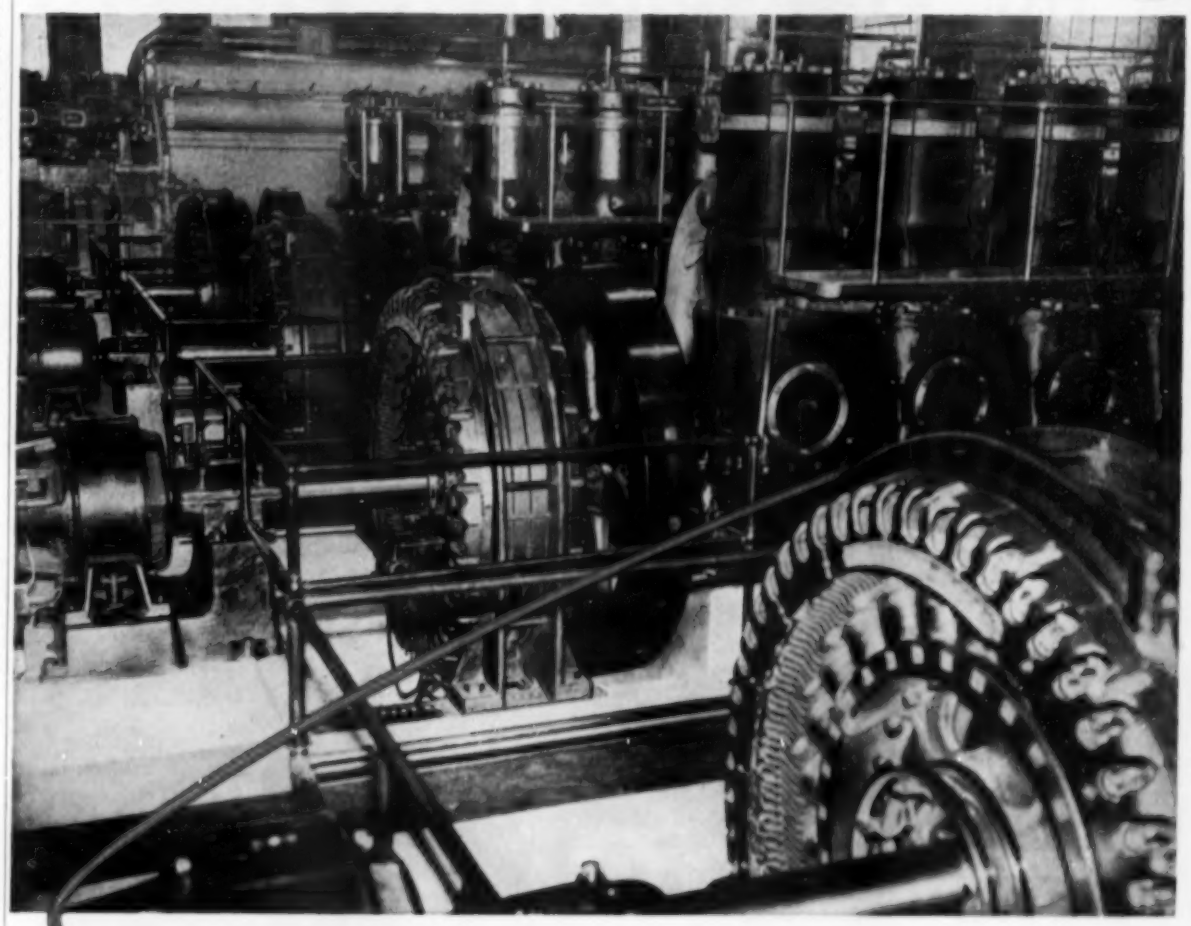
Adds To Field Organization

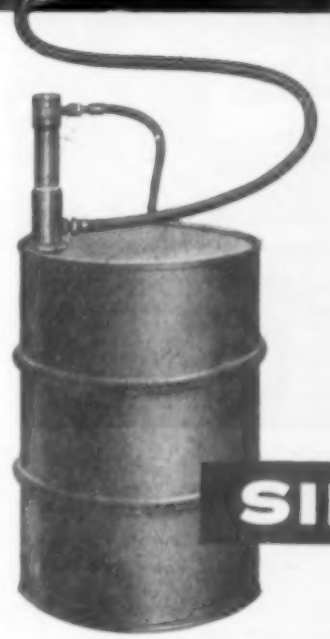
Due to an expanded and more complex diesel engine market and new models added to its line of industrial and marine diesels, the Detroit Diesel Engine Division of General Motors has added five more sales and service representatives to its administrative field organization. The new representatives, advanced from home office sales and service departments in Detroit, will help man new sales and service zones created by a rearrangement of previously existing territories.

The men appointed and their territories as announced by E. F. Bentley, Detroit Diesel's general sales manager are: G. R. Holly, sales representative, covering Arizona, New Mexico and Utah; Stanley Partel, sales representative, covering the Dakotas, Minnesota and Eastern Iowa; K. L. Post, service representative in Colorado, Montana, Nebraska and Wyoming; Vance Shields, service representative in Northern Illinois, Michigan and Wisconsin and R. A. Stephens, service representative, covering Western New York, Ohio, Western Pennsylvania and West Virginia.

With the addition of the "6-110" and "4-51" models to the Division's original "71" series of engines and continuing advances in engine design, the expanded field staff will help provide the closer coordination now desirable between the factory and its sales outlets, according to Mr. Bentley.

Resists Wear!





Switch now to Sinclair GASCON® Oils for top anti-wear lubrication and longer engine life in your diesel engines.

Actual performance results prove that the superior GASCON Oils eliminate stuck piston rings, reduce carbon deposits on vital engine parts, cut cylinder wear to a minimum . . . and improve the ratio of KW-HRS. per GALLON of Lubricating Oil.

Sinclair GASCON and GASCON H.D. Oils *can save you money* by assuring longer bearing life . . . higher productivity . . . lower operating costs.

See your Sinclair Representative today for further information or write Sinclair Refining Company, Technical Service Division, 600 Fifth Avenue, New York 20, N. Y. *There's no obligation.*

SINCLAIR

GASCON OILS

West Coast Diesel News

By James Joseph

TO BALDWIN CONTRACTING Co., Marysville, Calif., a new model 124 Murphy diesel 150-kw generator set and a rebuilt Murphy model ME 46, 66-kw generator set to power the firm's new Madsen hot plant.

FOR STORM drain pumping in Long Beach, Calif., 3 350-hp Buda diesels. Purchaser was Cascade Pump Co. Sale: through Anderson-BeVier Co.

FOR THE ALASKA ROAD Commission, Seattle, a Fairbanks-Morse model 48AF3½, 5-kw generating set.

TWO FAIRBANKS-MORSE model 45, 60-cycle diesel generating sets have been purchased by Western Electric Co., Inc., San Leandro, Calif.

"BUSINESS has been good the last few months," reports C. R. Evans, Evans Engine and Equipment Co., Inc., Seattle, "and we expect it to continue." Illustrating sales upswing, Mr. Evans points to 23 GM 4-51 diesel engines his firm has sold during the winter's buying season to gillnetters and trollers.

FOR CONSTRUCTION WORK in Kansas, Morrison-Knudsen Co. of Boise has taken delivery of a new model 54-B Bucyrus-Erie powered with a Buda 8-DAS-1125 engine with Torcon converter.

SOLD TO NICK ZIMMERMAN, Molalla, Ore., a model 2464 White truck powered by a Buda 6DAS-516 diesel engine. Sale by White Motor Corp., Portland, with servicing through Hamilton Engine Sales Inc., also of Portland.

B. C. K. LOGGING Co., Princeville, Ore., has taken delivery of a new Cummins NRT-6-BI turbodiesel engine for conversion of a logging truck.

PORTLAND's Pierce Freight Lines recently put into operation a new fleet of 25 Kenworth COE tractors, all powered by Cummins NHB-600 engines.

FOR OPERATIONS over-the-road between Vancouver and Toronto-Montreal, Vancouver's Southern Freightways, Ltd. has put six new Diamond T 723-C COE tractors into service. Tractors are powered by Cummins JBS-600 engines.

CALIFORNIA's FORREST HILL Lumber Co. is repowering a model 70 Lorain crane with a new Model 21 Murphy diesel engine. Sale through San Francisco's Oswald Machine Works.

FOUR GM 4-51s, purchased thru Evans Engine and Equipment Co., Inc., Seattle, have gone into several new, 34-ft. gillnetters operated by Kazulin-Cole in the Seattle area.

SOME OTHER recent GM 4-51 fishing fleet sales: two GM diesels to the Carl Rubenstein Co. (gillnetters); one engine to Tom Morton for his 25-ft sport fisherman; two engines to Sagstad Shipyards for 34-ft. beach seiners; a 4-51 to Charles Mohr, Cordova, Alaska, for his gillnetter.

FOR MORRIS HOLMBERG's troller *Frisco*, a GM 3-71. Evans Engine and Equipment Co., Inc. Seattle, also has delivered a GM 6-110 to Ira Booth, Metlakatla, Alaska, for his 70-ft. cannery tender, the *Robbie*.

TO GOULDINGS TRADING POST, Kayenta, Arizona, a Fairbanks-Morse 40-kw, 60-hp Model 49 diesel generating set.

ANOTHER FAIRBANKS-MORSE, a model 19B4½ power unit (56 hp) has gone to Quality Service & Supply Co., Logan, Utah, reports C. E. Dietle, manager, Fairbanks-Morse & Co's diesel division, out of Chicago.

WAGNER TRACTOR CO., Portland, has installed seven Cummins HRCBI-400 engines in their model TR-9 tractors and eight Cummins HRI-600s in model

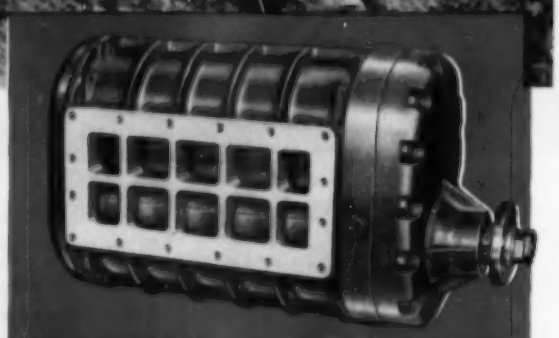
GIANT HD-21 CRAWLER DOZES with md Supercharged Power!

ALLIS-CHALMERS STANDARDIZES ON MIEHLE-DEXTER SUPERCHARGERS FOR THEIR DIESEL ENGINES

Like so many leading Diesel engine manufacturers, Allis-Chalmers specifies Miehle-Dexter Superchargers for their engines.

And that's one of the reasons this new giant torque converter driven crawler tractor—the Allis-Chalmers Model HD-21—claims to be one of the most powerful crawlers . . . anywhere! Rough and rugged dozing needs power aplenty. And here's *extra* speed at any load, *extra* pushing or pulling power at any speed, wider speed range and more range overlap—thanks to Miehle-Dexter Supercharged Power.

You, too, can boost the horsepower of your engines by 50% or more . . . and decrease weight per horsepower, too. Miehle-Dexter engineers can specify the exact size and type M-D supercharger for your engines. Standard M-D models available for applications to 750 hp. Write for bulletin.



FOUR FEATURES PROVE MIEHLE-DEXTER SUPERCHARGERS BETTER ON THE JOB

- Patented end plate seals eliminate metal-to-metal contact, assure longer life, help achieve fuel savings.
- Rotor wear strips eliminate contact between rotors and housing, assure longer wear.
- Lightweight aluminum rotors and aluminum case boost engine horsepower, do not add weight, safely allow high speeds.
- All parts are standardized, allowing easy field service and interchangeability.

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TR-14 tractors—all these during March, 1955. Versatile Wagner tractors have been receiving big reception by large-scale farmers. Some tractor features: they're four-wheel, rubber-tired, have unique steering and suspension—and they're opening a new field (and market) for large farm tractors, reports Cummins Engine Co's assistant Northwest regional manager, H. R. Ginther.

FOR DELIVERY through Pape Bros., to F. L. McEwen, a new model HD-21 Allis-Chalmers crawler tractor with Twin Disc torque converter powered by DS-844 Allis-Chalmers-Buda diesel engine.

VAN AKEN SAND and Gravel, Forest Grove, Ore., has taken delivery of a new 200-kw diesel-electric generator set powered with a 8DCS-2505 Buda diesel operated at 900 rpm—for use with the firm's portable crusher plant in and around Forest Grove. Sale: through Hamilton Engine Sales, Inc., Portland.

DELIVERED TO Ellensburg Cement Products, Inc., Ellensburg, Wash., a GM 4-51 to repower a model 15B Bucyrus-Erie shovel.

Opens Headquarters

Fairbanks, Morse & Co. has opened a new sales and service headquarters in Fair Lawn, N.J., for a seven-state area including Connecticut, New York, New Jersey, eastern Pennsylvania, Maryland, Delaware and Virginia. The company's export division sales offices also are located in the new headquarters building. The 50,000 sq. ft. building serves as a central shipping point for a wide variety of company products which will be stocked in the warehouse.

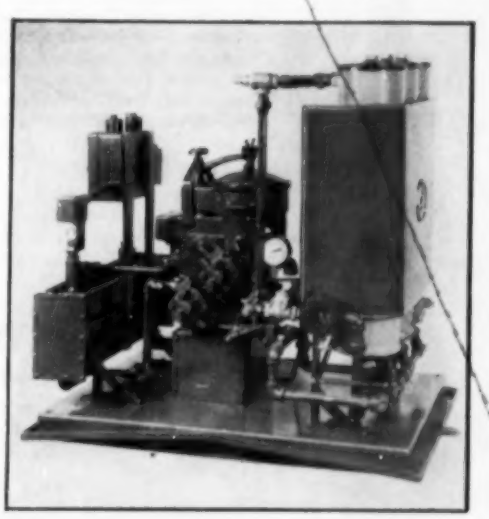
The building was designed as a model service center with full stocks of repair parts for engines, scales, pumps, motors, power mowers, water systems and other products. In addition, this department has equipment and skilled personnel for repair of these products. Finally, the service center is headquarters for the service erectors who install new equipment and make equipment repairs on the job-site. The central location and improved facilities will permit prompt delivery of repair parts and overnight emergency service throughout the seven-state area.

The new regional headquarters, with its staff of more than 200 persons, replaces the domestic and export sales offices formerly at 80 Broad St., New York City, the scale service shop formerly at 601 W. 26th St. in New York, and the warehouse and shipping center formerly at 401 N. Broad St. in Philadelphia. In addition to the Fair Lawn installation, Fairbanks-Morse continues to maintain sales offices, scale repair shops, and emergency warehouse stocks in Philadelphia and Baltimore and a scale office at 230 Park Ave., New York City. The Railroad Division office at 230 Park Ave., New York, was not involved in the move.

Water Works To Be Remodeled

The Municipal Water Works of Hammond, Indiana will soon be completely remodeled to handle the city's increased water demand. As the first step in the new program, Worthington Corporation was awarded a contract for five new water works pumps. One of the five new pumps will be driven by a Worthington 8-cylinder, heavy duty direct drive diesel engine. While this unit is for standby service it is capable of continuous operation and will have a rated capacity of 30 million gallons a day.

The other four units consist of one 13-million-gallon-a-day pump driven by a 400 hp motor; one 19.5 Mgd pump driven by a 600 hp motor; a 25 Mgd pump driven by a 700 hp motor and one 30 Mgd pump driven by a 1250 hp motor. The motors for these four pumps are manufactured by Electric Machinery Mfg. Co., a wholly owned Worthington subsidiary. Consulting Engineer for the new project is Leo Bessozi of Hammond, Indiana.



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The refiners of your engine lubricating oil gave it high "endurance value" . . . continued stability and resistance to breakdown . . . long-lasting wetting ability . . . film strength . . . adhesion.

Keep *all* the value they put into the oil . . . by keeping it clean and dry . . . with a *De Laval* Diesel Oil Purifier.

De Laval provides maximum protection for your diesels. There is a type and size to fit every installation . . . to keep oil *clean* . . . keep it *dry* . . . day after day, month after month, year after year!

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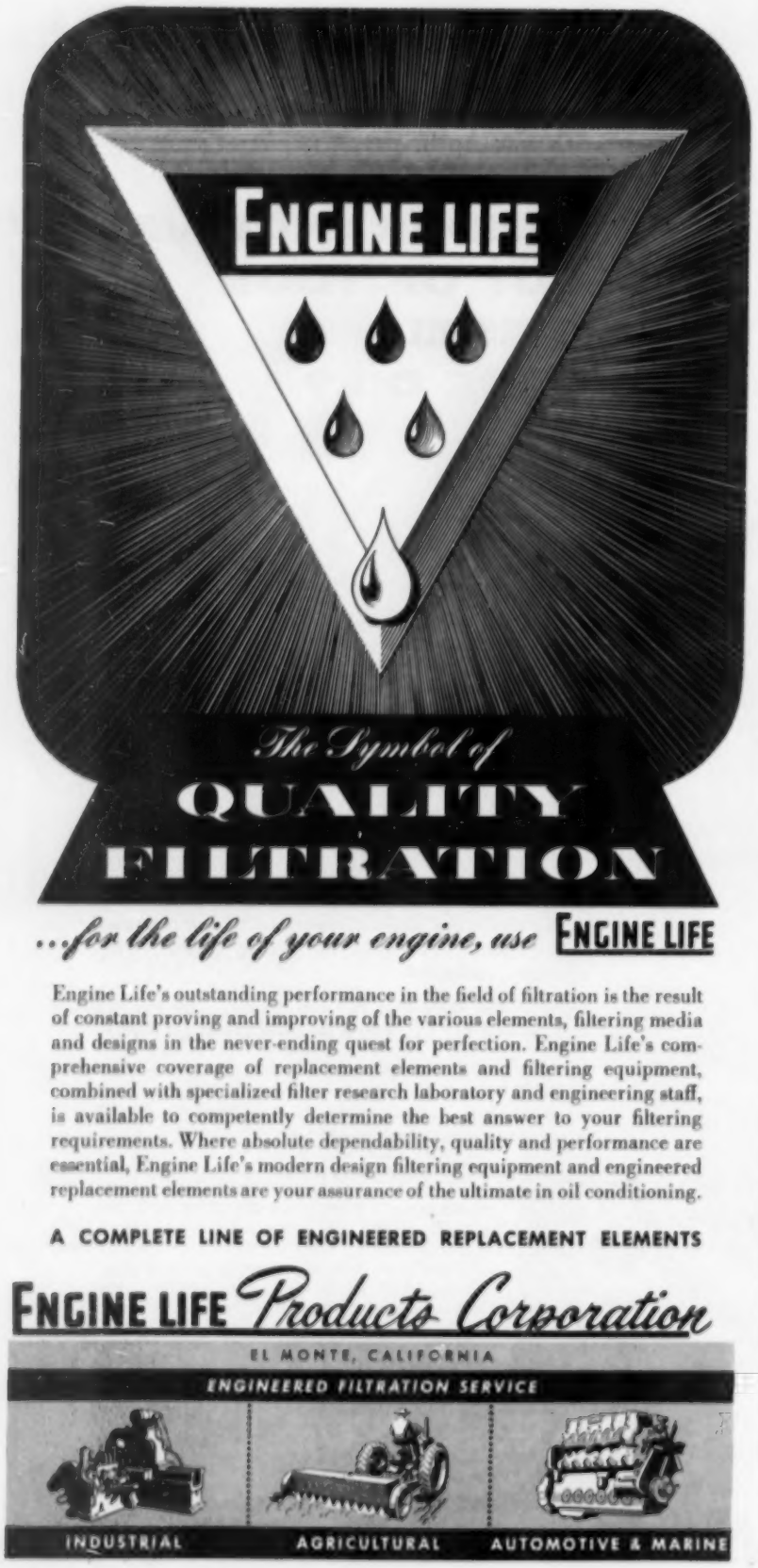

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Engine Life's outstanding performance in the field of filtration is the result of constant proving and improving of the various elements, filtering media and designs in the never-ending quest for perfection. Engine Life's comprehensive coverage of replacement elements and filtering equipment, combined with specialized filter research laboratory and engineering staff, is available to competently determine the best answer to your filtering requirements. Where absolute dependability, quality and performance are essential, Engine Life's modern design filtering equipment and engineered replacement elements are your assurance of the ultimate in oil conditioning.

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- Nozzle-Injector Cleaning Tools and Lapping Blocks
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- Engine Removal and Parts Dollies
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76 Pages—275 Illustrations
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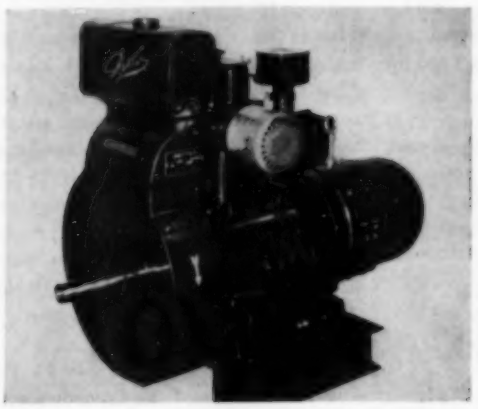
AD-15

Introduces Aircooled Generator Set



In introducing a new line of small diesel generator sets, the Petter Diesel Engine Division of Brush Aboe, Inc. has not overlooked the needs of the commercial fishing industry. They have developed a 1500 watt, dc 32 volt, battery charging set which is powered by the well known Petter PAZ1, 2-½ hp aircooled diesel engine. The generator on this unit is flange mounted and provision is made for a belt drive off the front end for a bilge pump or small compressor. The standard set comes equipped with electric starting, however, the engine can be started manually in case the batteries are down. Total weight of the unit is 460 lbs. and the overall height is 30 inches. (IT'S NEW)

Small Dieselized Pleasure Craft

One of the smallest dieselized pleasure boats to operate on American waters is the 22-foot express cruiser *Melita*, delivered in December to a West Coast yachtsman. The craft is a Viking 22 cruiser, designed and built by the Youngquist Boat Works of Seattle, Washington. It is powered by a General Motors "4-51" diesel. The engine turns a wheel 14 in. x 11 in. without reduction and in trial runs the *Melita's* top speed was logged at 27.6 miles per hour at 3000 engine rpm. Cruising speed is 23 miles at 2500 rpm. The craft's load waterline aft is 20 in.

Sales Manager

Jack N. Yetter

The appointment of Jack N. Yetter as sales manager—General Products Division, has been announced by N. F. Adamson, vice president—Sales, of the Twin Disc Clutch Company, Racine, Wisc. Mr. Yetter is filling the spot recently vacated due to the retirement of E. C. (Ted) Billings, who has been associated with Twin Disc in an executive sales capacity for twenty years. Mr. Billings will continue to act in a consulting capacity. Mr. Yetter has been associated with the Twin Disc Clutch Company for the past six years, beginning as a district sales engineer in the Tulsa office in 1949. He became district sales manager of the Tulsa office in 1950 and moved to Racine, Wisconsin as sales promotion manager in 1953, before being promoted to his present assignment.

Immediate shipment . . . no waiting or delays in receiving your reconditioned cylinder head.

Heads available for most popular makes of diesel engines.

Guaranteed as good as new and up to the manufacturer's original specifications.

Surprisingly low cost. You pay only for restoration and shipping.

DIESEL CYLINDER HEADS

When extended downtime means a serious business loss, call or wire Guth-Pascoe. Guth-Pascoe offers immediate exchange service on most popular diesel engine cylinder heads . . . fully reconditioned, completely guaranteed, ready for instant shipment by the fastest means possible. You get full credit for your old cylinder head upon its return. You pay only the cost of restoration and shipping charges.

The GUTH FUSION PROCESS is a scientific system of rebuilding broken and cracked castings. Developed and patented in many of its phases by Carl R. Guth, its use is supervised every step of the way by a specially trained expert. Do not discard that old cylinder head. It can be replaced at a small fraction of its original cost. When you have a problem, it will pay you to consult Guth-Pascoe.

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1. **Stick To The Job?**...Metal-Cals are permanent, indestructible!
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Gulf Coast Diesel Notes

By Michael T. Pate

ZAPATA OFFSHORE COMPANY, Longview, Texas, has bought through Oilwell Supply Co., Houston, five General Motors twin 6-110 model 122403 diesels, each equipped with torque converter, the five to be used to power an offshore drilling rig.

GULF OIL CO., Houston Pipe Line Division, Beaumont, Texas, has secured from Buda Engine & Equipment Co., Inc., Houston, two Buda BD77 diesels, to be used for standby power on two salt water disposal pumps.

HIDALGO CITY WATER Cont. & Improvement District No. 16, Edinburg, Texas, has bought from Fairbanks, Morse & Co., two 4-cylinder 300-hp model 38F5¼ diesels; two model 49B4½ 40-hp diesels; and two 8-cylinder 600 hp model 38F5¼ gas engines.

ESSAR RANCH, San Antonio, Texas, has bought through Stewart & Stevenson Services, Inc., Houston, two Red Head deep-well pumps, each powered by a General Motors 3-71 vertical engine, direct-connected to the pump shaft.

HOUSTON OILFIELD Material Co., has bought from Buda Engine & Equipment Co., an Onan model 3DSP 3 kw air-cooled dieselized generator set to be used with an offshore directional drilling rig.

CLEGG SHRIMP Co., Port Lavaca, Texas, has bought from Cummins Sales & Service, Houston, a model HRMS, 225-hp diesel to power a shrimp boat.

PURE OIL Co., Houston, has bought from Buda Engine & Equipment Co., a model 2BD77 Buda diesel, rated at 12 hp. The diesel will be used to power a wire line measuring reel in the company's oil well drilling department.

TELLEPSEN CONSTRUCTION Co., Houston, has bought from Big 3 Welding Equipment Co., Houston, four 300 amp ac welding generators, each powered by a General Motors 2-71 diesel. The units will be used in general construction work.

WESTERN CO., Midland, Texas, has bought through Stewart & Stevenson Services, Inc., Houston, three General Motors 4-71, model 4031C diesels to power sand-mixing plants, and one General Motors 6-110, model 62403, to drive a sand-frac pump.

NATIONAL SUPPLY Co., Houston, has bought from Mustang Tractor & Equipment Co., Houston, a Caterpillar model D315DE, self-regulating generator, drive diesel driving a 3-phase, 60-cycle, 220-volt 30-kw generator at 1200 rpm. The unit will be used as drilling rig drive.

OLIN MATHIESON Chemical Co., Pasadena, Texas has secured from Big 3 Welding Equipment Co., Houston, three 300-amp ac welding generators, each driven by a General Motors 2-71 diesel rated at 35 hp.

MAQUINARIA y ACESSORIOS Laguna, Laredo, Texas, has bought from Buda Engine & Equipment Co., Inc., two Buda diesels, model DA844, each rated at 180 hp, to be used for irrigation drives.

SUPERIOR OIL Co., Lake Arthur, Louisiana, has bought two Stewart & Stevenson model 2GD20 20-kw ac generator sets, each powered by General Motors 2-71 diesels. The units will be used for lighting and auxiliary power.

BREWSTER-BARTLE Drilling Co., Houston, has bought from Waukesha Sales & Service a model 135DKU dieselized unit to be used for drilling rig auxiliary power.

How Much Surface Area is there in this CP* Filter Element?

☐ 3 SQUARE FEET

☐ 11 SQUARE FEET

☐ 16.5 SQUARE FEET

Here's a good tip. The contact area of this CP* element is at least twice as great as the contact area of a surface type filter of equal dimensions.

The greater contact area of the Winslow CP* element results from a combination of effective filtering materials. Every surface of the cotton thread is porous and fluffy for dirt retention; all the area of the cellulose fibre picks up harmful contaminants. These materials are carefully mixed to permit oil flow without packing or channeling of the filtering media. Gums, moisture and varnish are absorbed by the chemically treated fibres.

Most important is the patented CP* material that accepts varying percentages of the total oil flow as conditions dictate, insuring 100% full flow filtration at all times, while it maintains acceptable pressure losses without opening by-pass valves.

Assurance of complete oil filtration under any operating conditions, substantially greater surface area, and longer effective life are advantages of Winslow CP* elements that have been proved by thousands of engine owners. These exclusive advantages can be demonstrated on your engines. Let us give you complete data on filters and elements for your equipment. Please write or call the nearest office.

Longer Useful Life

In the CP* element, oil passes through V-shaped traps in which contaminants are progressively caught, according to particle size. Instead of massing on the outside of surface filters to eventually become impervious, these contaminants gradually fill the V-shaped traps, so that the element has substantially longer useful life.

This is the answer to filter area: The contact area of this Model 935-0 element is composed of cotton thread and cellulose fibre with a total effective filter surface area of 16.5 sq. ft. An average surface type element of this size has an effective area of 7.2 sq. ft.

WINSLOW FILTERS *CP* is fully protected by patents and trademarks*

Winslow Engineering Company, 4069 Hollis Street, Oakland 8, California • Eastern Factory: Murray, Kentucky

ABBOTT & TRAXLER, Corpus Christi, Texas, have bought from Stewart & Stevenson Services six General Motors 6-71 diesels and six Red Head deep well turbine pumps. The diesels will be mounted with crankshaft vertical, and direct-connected to pump shaft. The pumps will be used on the Ute Mountain Farm of the company, at Questa, New Mexico, for irrigation purposes.

CARD COMPANY, Pharr, Texas, has bought from Whites, Inc., of Houston, five model UD18A 125 hp International Harvester diesels; which will be used in deep well irrigation service.

BREWSTER-BARTLE Drilling Co., Houston, has bought from Stewart & Stevenson Services, Inc., twin model 12103, 6-71 General Motors diesels with Twin Disc torque converters to be used as a rotary table drive on a drilling rig.

CALCASIEU SHIP Yards, Calcasieu, Louisiana, has bought from Buda Engine & Equipment Co., Inc., two 15-kw marine ac generating sets, each powered by a model BDMG153 Buda diesel. The sets are for use by the Louisiana Highway Department.

OILWELL SUPPLY Co., export division, New York City, has bought seven Stewart & Stevenson model 20DA oilfield utility units for overseas service. Each unit consists of a General Motors 2-71 engine driving a 20-kw, 115-volt, dc generator, 17 cu. ft./min. air compressor, and a 1½-in. Gardner-Denver washdown pump. The engines will develop 34 hp at 1200 rpm.

TEXAS CONSTRUCTION Materials Co., Columbus, Texas, has bought from Cummins Sales & Service, Houston, a model NHRIS Cummins diesel rated at 300 hp which will be used to repower a switching locomotive.

CARDINAL CHEMICAL Co., Odessa, Texas, has bought through Stewart & Stevenson Services, Inc., two General Motors 6-110 diesels to power a sand fracturing pump.

BEXAR EQUIPMENT Co., San Antonio, Texas, has secured from Big 3 Welding Equipment Company, Houston, two Lincoln 300 amp ac welding generators, powered by General Motors 2-71 diesels. The generators will be used in pipeline welding.

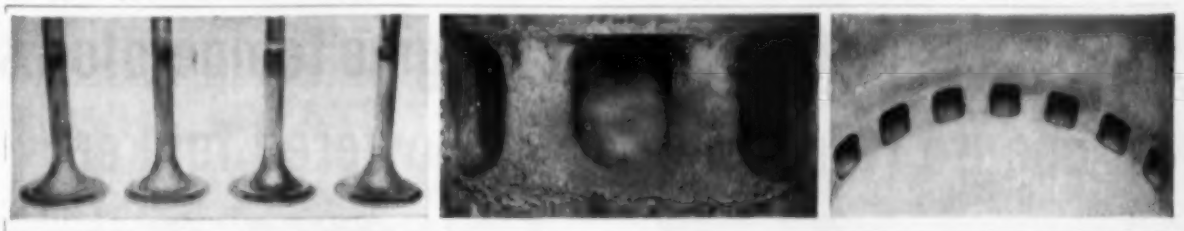
Assumes Additional Title

Roy C. Ingersoll, president of Borg-Warner, has assumed the title of president and chairman of the board following action by the directors of the corporation. The post of chairman has been vacant since the death of C. S. Davis in Paris, France, in July, 1954. Prior to Mr. Ingersoll's election to the presidency in 1950 he was vice president of Borg-Warner and president of the corporation's Ingersoll divisions.

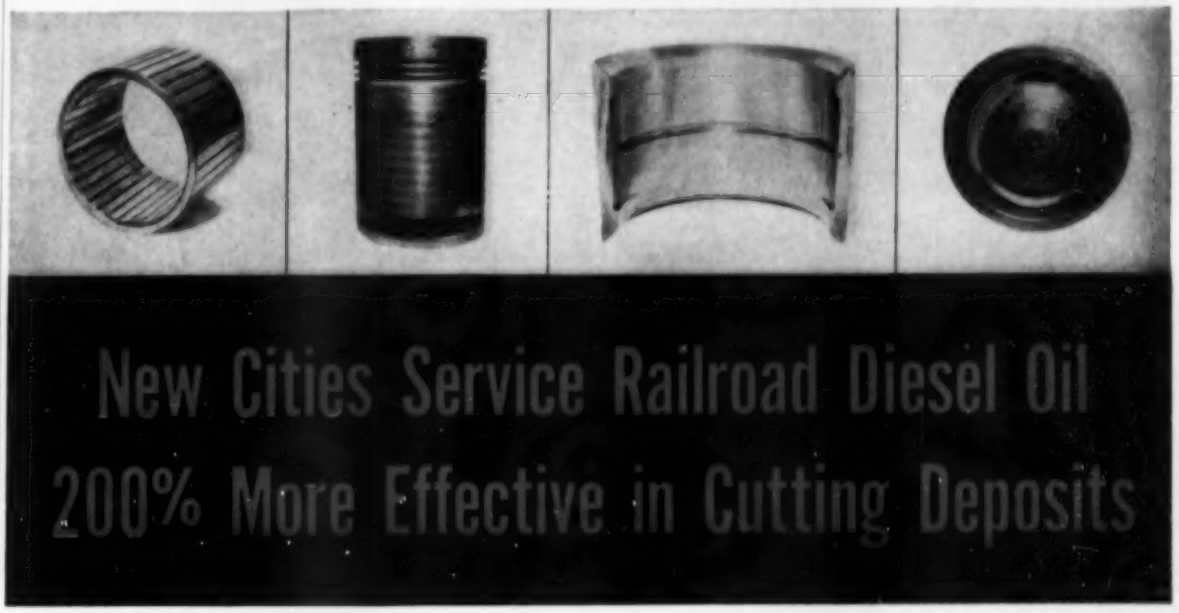
Liquid Level Bulletin

A new 26 page bulletin describing the complete line of liquid level gauges for indicating, recording, controlling, and telemetering has just been released by The Bristol Company of Waterbury, Conn. The well illustrated, two color bulletin shows float-type pressure-type, differential pressure-type, and bubbler-type liquid and water level gauges, in strip and round-chart models. Air or electric controllers are available in several models. A new weatherproof case is shown for the 8 and 12-inch round chart recorders and controllers.

Engineering data on the choice of the proper bulb, and instrument for a given installation are presented, as well as installation information on liquid level telemetering and remote control. Copies of bulletin L701 are available on request from The Bristol Company, Waterbury 20, Connecticut.



UNRETOUCHED PHOTOGRAPHS OF ENGINE PARTS AFTER EXHAUSTIVE ROAD SERVICE TESTS USING NEW PACEMAKER RD-80 DIESEL OIL.



2,000,000 Test Miles of Operation with New Pacemaker RD-80 Diesel Oil Also Reveal Up To 10% Reduction in Oil Consumption. Railroads and Engine Builders Acclaim Results.

During extensive road service tests of New Pacemaker RD-80, these eight distinct advantages were apparent:

- Exceptional oxidation stability—"the best of any oil tested," according to the laboratory of one engine builder.
- 200% greater efficiency in reducing engine deposit build-up in exhaust ports and other engine parts.
- Absolutely no corrosion.
- Detergent-dispersant qualities that caused every company testing the oil to comment—"engine parts exceptionally clean."
- New protection of ring belt area due to high viscosity index of RD-80, not found in ordinary diesel oils.
- Up to 10% reduction in oil consumption.
- Reduced maintenance, resulting from wear protection that far exceeds builders' specifications.
- Heavy-duty features insure outstanding performance and fuel economy even with low-grade fuels and toughest operating conditions.

Now ready to supply this new Pacemaker RD-80 Diesel Oil to the railroad industry, Cities Service invites further inquiry. Write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

CITIES SERVICE
QUALITY PETROLEUM PRODUCTS

Mid-Continent Diesel News

By Jack F. Cozier

GEORGE E. FAILING CO., Enid, Okla., has purchased two Buda HP-326 natural gas engines for a rotary rig. The units were sold by Buda Engine & Equipment Co., Tulsa, Okla.

MURPHY DIESEL CO., Milwaukee, Wisc., recently established two new dealers. They are Clark Equipment Co., Little Rock, Ark., and Tri-State Equipment Co., Memphis, Tenn.

LYLES & BUCKNER, AGC highway contractors, Muskogee, Okla., purchased a Cat D7 tractor, from McCormick Machinery Co., Tulsa, Okla., which was equipped with a #25 cable control and a 7S dozer.

ON DISPLAY at Cummins Sales & Service, Oklahoma City, Okla., is one of the new Cummins turbocharged NT-6-BI diesel engines. The unit has a Nugent pressure filter, Delco-Remy generator and starter, and a Bendix-Westinghouse compressor.

BELL ENGINE SERVICE, Great Bend, Kansas, has bought an 8PC-2505 and eight model 8MO-1290 natural gas engines to power irrigation wells in Western Kansas. Sale was made by Buda Engine & Equipment Co., Tulsa, Okla.

CAPITT DRILLING CO., Wichita, Kansas, repowered a H-150 Bethlehem 7¼x12 pump with a Model 124 Murphy diesel. Engine sale was by Manufacturers Distributing Co., Great Bend, Kansas. The split rig is working in Cowley county, Kansas.

CARTER OIL CO., Tulsa, Okla., has purchased a Chicago Pneumatic 365-RO2 portable rotary air compressor powered by a GM 471 diesel engine. The unit was sold by Leland Equipment Co., Tulsa, Okla., and will be used in Carter's Billings, Mo., refinery.

GASO PUMP & BURNER Mfg. Co., Tulsa, Okla., has purchased an 8MO-1290 Buda natural gas engine to power a pipeline pump in West Texas. The unit was sold by Buda Engine & Equipment Co., Tulsa, Okla.

RIDDLE Quarries, Kansas City, Mo., recently bought a 122 Murphy diesel engine to repower a rock crusher. The 190 hp unit was sold by Funkhouser Machinery Co., Kansas City, Mo.

CHARLES GREEN, custom contractor, Tulsa, Okla., has just purchased a Cat D7 tractor, with four RA6 Preco backrippers, a #25 cable control, and a 7S dozer. The equipment was sold by McCormick Machinery Co., Tulsa, Okla.

D & R DRILLING CO., Norman, Okla., has in operation a National 50 rig using 3 Buda 8MO-1290 natural gas engines.

FOSTER CONSTRUCTION CO., Tulsa, Okla., has repowered a ¾ yd. Bucyrus-Erie shovel with a 371 GM diesel engine purchased from Diesel Power Co., Tulsa, Okla.

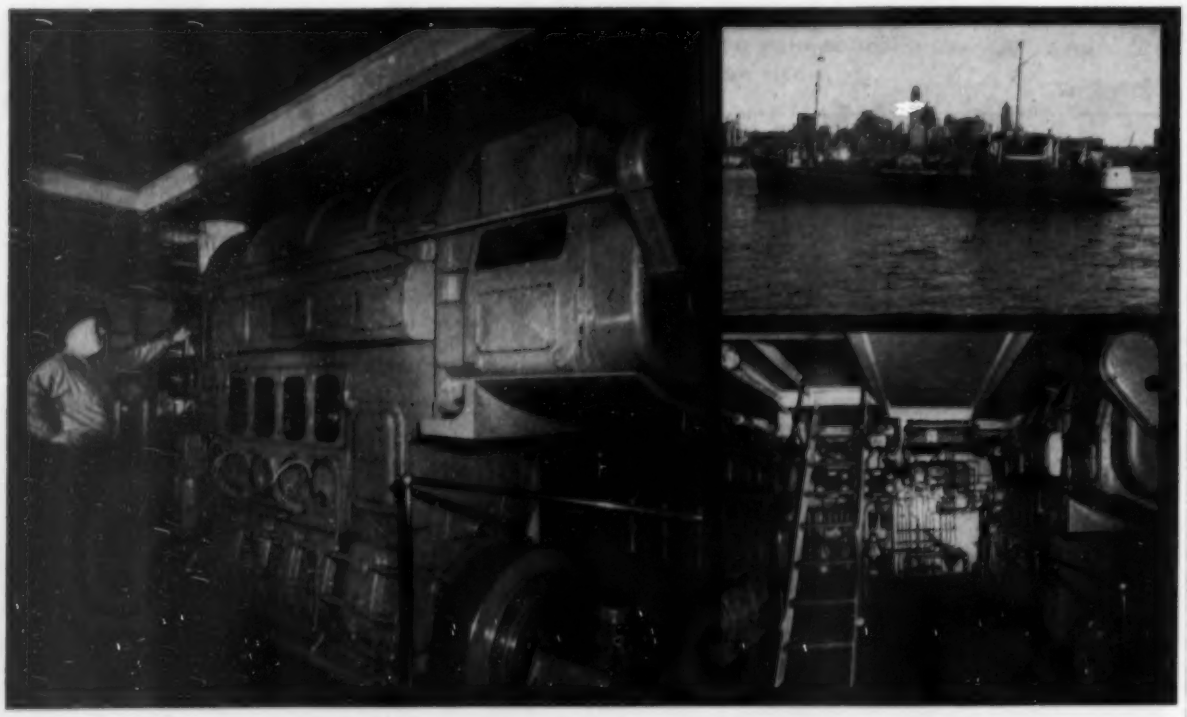
POWELL DRILLING CO., Garber, Okla., repowered a Franks portable rig with an HRP-600 Cummins diesel. The sale was made by Cummins Sales & Service, Oklahoma City, Okla.

WHITE & ELLIS DRILLING CO., Inc., El Dorado, Kansas, have in operation a new Bucyrus 36-L spudder powered by a Buda 6 MO893 engine.

CLAUDE WENTWORTH DRILLING CO., Tulsa, Okla., have repowered a U-15 Unit rig (compound rig) in the Denver-Julesburg basin with three model 122 Murphy diesels. This sale was negotiated with Wentworth's Russell, Kansas, office by Manufacturers Distributing Co.

FOSTER CONSTRUCTION CO., Tulsa, Okla., repowered a ½-yd. Bucyrus-

ROSS EXCHANGERS control engine temperatures aboard Fairbanks-Morse powered tanker



Transporting 300,000 gallons of gasoline or diesel oil at a draft of only 8 ft., the "V. L. Keegan II" carries twice as much paying cargo per trip as her competitors through shoal waters in and around New York. Powering this 199-ft. motor tanker are two 640 hp Fairbanks-Morse opposed-piston Diesels.

To maintain desired engine operating temperatures, Ross Exchangers have been furnished for both lube oil and jacket water cooling.

Because of their high thermal efficiency and outstanding record for ruggedness in maritime service, Ross Exchangers are regularly favored for numerous types and makes of sea-going equipment: engines, compressors, boiler feed pumps, turbines, blowers, reduction gears and hydraulic clutches . . . to cool oil, water, air and hydraulic fluid.

Completely pre-engineered and fully standardized, Ross Exchangers can be assembled from mass produced parts and sub assemblies to answer *your* requirements . . . *promptly*.

For more information, request Bulletins 2.2K1 and 2.1K5.

KEWANEE-ROSS CORPORATION
DIVISION OF AMERICAN RADIATOR & STANDARD SANITARY CORPORATION
1425 WEST AVENUE • BUFFALO 13, N. Y.
In Canada: Kewanee-Ross of Canada Limited, Toronto 5, Ont.

Erie shovel with a GM 271 diesel engine. The sale was made by Diesel Power Co., Tulsa, Okla.

H. V. DUNCAN Drilling Co., Fairfield, Ill., has put in operation near Jones, Okla., an Oilwell 64-A rig powered by Buda PC 1879 engines.

Available June 15th

On June 15th, Volume 20 of DIESEL ENGINE CATALOG will start going into the mails. This latest edition of the standard reference book of the diesel industry has achieved the largest pre-publication demand in the previous nineteen year history of DIESEL ENGINE CATALOG.

Various valuable features have contributed to the Catalog's great acceptance. The engine section describes and illustrates products of all major manufacturers of diesel, dual-fuel and gas engines. The text is supplemented by photographs and power curves. Superchargers and turbochargers are covered by descriptions and illustrations. The latest information on torque converters, fluid drives and other power transmissions are included.

Of particular importance is the accessory equipment section. The past year has witnessed a strong surge of new developments in fuel injection systems, control devices and other auxiliary units in order to keep up with engine advances. These accessories are fully described in Volume 20.

The Market Place of DIESEL ENGINE CATALOG has been a consistently growing department. Its classified arrangement gives fingertip information on where to obtain practically any item or service necessary to the proper maintenance, purchase or repair of diesels.

Volume 20, DIESEL ENGINE CATALOG reflects all changes and new developments which have occurred over the past year. It is completely authoritative and accurate and is designed to serve a basic function for diesel users, buyers, sellers and service organizations. Volume 20 can be ordered from DIESEL PROGRESS, Cole Station, Los Angeles 46, Calif. The cost remains the same as in previous years, $10.00 per copy, postpaid. (For California delivery, please add sales tax.)

Diesel-Electrics Bring Operating Costs Down

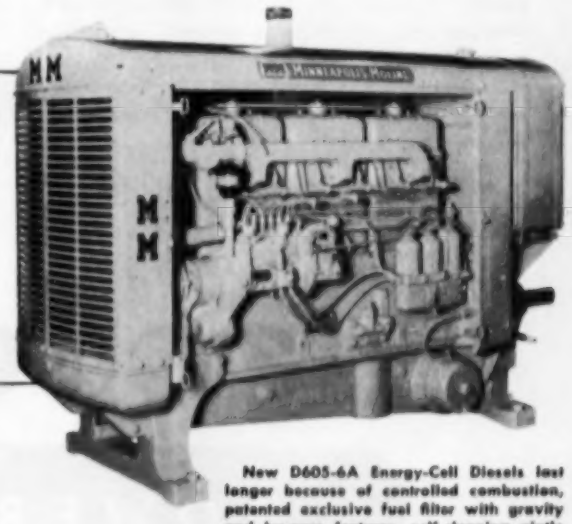
Six new General Electric diesel-electric locomotives are helping the Panther Valley Coal Company of Pennsylvania bring coal prices down to what is considered a satisfactory sales level, and allow them to operate more profitably. The Panther Valley Coal Company, principal producer of Old Company's Lehigh Coal, operates anthracite properties in the lower anthracite fields of Pennsylvania. The Lansford breaker processes coal mined and stripped from the coal lands formerly making up the Lansford and Nesquehoning Districts of the Lehigh Navigation Coal Company. Because of the consolidation of these two districts, railroad transportation of the coal to the central cleaning plant had become a major expense.

To reduce this expense, the heads of the firm, W. Julian Parton, Joseph Crane, and James and Frank Fauzio, took what is considered the revolutionary step of utilizing small, powerful diesel-electric engines to haul the coal to the Lansford preparation plant. Of the six units, three are 80-tonners producing 550 horsepower each, which are used to haul coal a distance of 4 miles against heavy grades. The three 25-tonners rated at 150 horsepower each are used for general colliery servicing. They are expected to offer a considerable savings in transportation costs over the old steamers. All six of the locomotives were delivered eight weeks after the order had been placed with G.E.'s Locomotive and Car Equipment Department, Erie, Pa. They entered service early in 1955.

WHY IT PAYS TO OWN INDUSTRIAL DIESELS WITH REMOVABLE CYLINDER BLOCKS AND HEADS

New MM diesels were developed with *energy-cells* to make them last longer, do more and go farther with less down-time and maintenance.

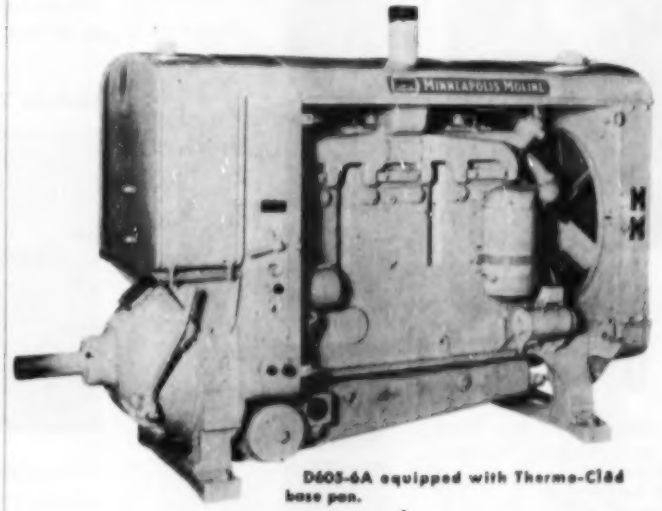
To provide owners with lower cost maintenance when necessary MM diesels are the most advanced and soundly engineered because the cylinder blocks are cast in pairs separate from the crankcase.



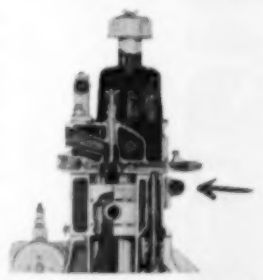
New D605-6A Energy-Cell Diesels last longer because of controlled combustion, patented exclusive fuel filter with gravity and by-pass features, self-cleaning pintle type nozzle, directed cooling of area around combustion chambers.

YOU GET THESE ADDED ADVANTAGES . . .

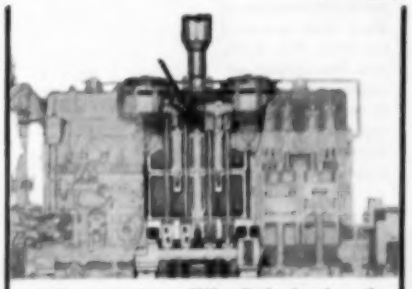
1. Ease of maintenance and low cost emergency service because paired cylinder blocks, pistons, and rods can be removed as a unit by one man.
2. Prolonged time between overhauls by use of close-grain cast iron that provides best cylinder lubrication for reduced wear.
3. Less service due to minimum distortion as MM cylinder heads, cylinder blocks and crankcase are virtually strapped together by full-length steel studs anchored in the main bearing bulkheads. (Transmits combustion pressure to heavy crankcase that has extra depth below center line of crankshaft.)
4. Efficient operation obtained by uniform cylinder expansion . . . the result of controlled cooling and long oil-cooled cylinder wall skirts below ring travel area.
5. "New engine" performance at extremely nominal cost can be obtained right in the field without special tools using factory matched cylinder blocks, pistons, pins, and rings. (Blocks are dowelled to crankcase to assure bore is square with crankshaft and pistons are precision fit to bore . . . equivalent to a factory job.)
6. Lower initial cost stems from high production parts by casting cylinder blocks in pairs separate from the crankcase.



D605-6A equipped with Therma-Clad base pan.



1. Cylinder head and block assembly shows coolant entrance at hottest point first and extra long skirt wall construction.



2. Close-up of how MM cylinder heads and blocks and crankcase are tied into a single rigid unit with long studs.

3. A D283 feature is extra large oil filter enclosed in base pan, floating-screen oil pump intake, and pump located in bottom of base pan.

Optional Therma-clad water-blanketed base pans for all units also have oil filter included to give more effective filtering.

INDUSTRIAL MM MINNEAPOLIS MOLINE MODERN MACHINERY DIVISION

MINNEAPOLIS-MOLINE

MINNEAPOLIS 1, MINNESOTA

Building Plant in England

Borg-Warner Limited, a newly created subsidiary of Borg-Warner Corp., is building a multi-million-dollar plant on a 30-acre site at Letchworth, England, to produce automatic transmissions, semi-automatic overdrives and other component parts for the British motor car industry.

"The upsurge of consumer buying in the United Kingdom and throughout the sterling area has fostered an increasing demand for products mass-produced after the American method," according to Roy C. Ingersoll, President of Borg-Warner. "It is in recognition of this demand that Borg-Warner is expanding its manufacturing facilities in Britain."

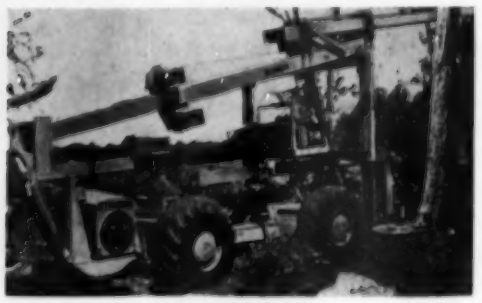
The name of Borg-Warner Limited replaces that of Morse Chain Limited which, as a Borg-Warner subsidiary, has produced chains and sprockets at Letchworth for the British market since 1919. Borg-Warner Limited will continue and will increase the manufacture of all products previously made by Morse Chain Limited, it has been announced.

High Volume Steam Cleaners

An extremely efficient heat exchanger, and a powerful pumping system, accounts for the high volume output of the new Model K line of Kelite steam cleaners. These compact, cleancut steam cleaners (gas or oil fired) feature capacities to 300 gallons per hour, with super duty models to 3000 gallons per hour. The Kelite heat exchanger raises the water temperature to 100° before the water enters the main heating circuit. This is accomplished by trapping waste heat, thus reducing fuel consumption. The automotive-type piston pump runs in oil and has stainless steel ball check valves to provide high volume output and dependable operation.

Another exclusive device automatically maintains the strength of the cleaning solution at the desired pH. The attractive straight-line cabinet requires no clay or firebrick and is louvered for adequate ventilation. All controls are on the front of the cabinet. An illustrated Bulletin No. 136 will be mailed by the manufacturer, Kelite Products, Inc., 1250 North Main Street, Los Angeles 12, California, on request. ITS NEW

Mobile Tree Saw



A newly-designed mobile saw is here shown felling a large tree on a 16,000-acre land-clearing project near Texarkana, Texas. One man sitting comfortably in a protective steel cage and operating simple controls moves the huge apparatus up to a tree and within seconds has it crashing to the ground. The unit, designed by R. G. Le Tourneau, Inc., of Longview, Texas is electrically operated. It produces its own current by means of an ac generator driven by a General Motor Series 71 diesel engine.

Twelve electric motors located at points of application drive the wheels, steering mechanism and saw. The cutting position of the six-foot saw being used can be adjusted to various heights and an overhead pusher-boom helps the operator direct the fall of the tree without notching. The area being cleared is to become a reservoir in a flood control project being carried on by the Corps of Engineers, U.S. Army, Lower Mississippi Valley Division.

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FOR EVERY USE

SELF CONTAINED UNIT
WIDE RANGE OF SIZES
CONSERVATIVE RATING
ROLLER BEARINGS
FINE ADJUSTMENT
ACCURATE BALANCE
S.A.E. DIMENSIONS

* ROCKFORD POWER TAKE-OFFS are available in standard sizes ranging from 125 foot pounds to 2100 foot pounds torque. Clutch sizes range from 6½ to 18 in. double plate. These complete, self-contained units are suitable for heavy-duty gear-tooth application to current industrial gasoline and diesel engines.

Send for This Handy Bulletin
Shows typical installations of ROCKFORD CLUTCHES and POWER TAKE-OFFS. Contains diagrams of unique applications. Furnishes capacity tables, dimensions and complete specifications.

ROCKFORD CLUTCH DIVISION BORG-WARNER
▲ 1321 18th. Avenue, Rockford, Illinois, U.S.A. ▲

CLUTCHES

AWARD PRESENTATION

Presentation of the replica of the DIESEL PROGRESS Efficiency Plaque.

Rex W. Wadman (left) presenting a replica of the DIESEL PROGRESS Efficiency Plaque to James W. Owens, Jr., (center) Manager of the M & A Electric Power Cooperative, Poplar Bluff, Missouri, and his superintendent, Howard W. Clutts, (right) on the afternoon of May 2nd at Denver during the Sixth Annual REA Generating Plants Operation and Maintenance Conference. The plaque itself, which is a heavy bronze casting, was shipped directly to Poplar Bluff, Missouri and is currently hanging on the front of the building near the entrance.

American-Bosch Appointments

Kenneth F. Leaman

Harold R. Sennstrom

Kenneth F. Leaman has been appointed vice president—Manufacturing and Harold R. Sennstrom vice president in charge of product development at the American Bosch Division, American Bosch Arma Corporation, Springfield, Mass. Mr. Leaman has been associated with American Bosch since 1954 having previously been with Consolidated Vultee Aircraft Corporation and United Aircraft Corporation in executive and manufacturing capacities.

Mr. Sennstrom came to American Bosch from American Locomotive Company of Schenectady, N.Y. where he has served for the past fourteen years in numerous posts including those of research engineer, executive engineer, chief application engineer and new product sales promotion manager.

American Bosch Division of American Bosch Arma Corporation is one of the nation's largest independent manufacturers of diesel fuel injection equipment and a leading producer of automotive and aircraft electrical products and jet aircraft engine components.

Cummins Distributor

Handing Edward L. Story, center, a signed contract which appointed him the Cummins distributor at Charlotte, N.C., is Paul J. Every, general sales manager, Cummins Engine Company. Watching the proceedings is Loyd E. Williams, left, Cummins' manager-distribution. Colonel Story is president of the new corporation, known as Cummins Carolina Diesel, Inc., with headquarters in Charlotte. The territory consists of the entire state of South Carolina and the southwestern portion of North Carolina. For many years, Colonel Story was vice president of Brown Equipment & Manufacturing Co., Charlotte. He formerly was with the Corps of Engineers, and, prior to World War II, was actively engaged in the automobile business.

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Direct-Drive Diesel Locomotives To Be Introduced Into U.S.

A type of passenger locomotive, new to the United States, shortly will make its debut on American railroads. This is the direct-drive motive unit which has been in use in Europe for some time, both experimentally and in scheduled service.

The particular unit soon to be adapted to American railroad needs is the Spanish "Talgo" type. Baldwin-Lima-Hamilton has acquired the license to manufacture the (German) Maybach locomotive and will construct three, each capable of pulling especially-built, lightweight trains up to 120 mph.

These "Talgo" units differ from the standard American diesel-electric locomotives in that they are direct-drive engines, transmitting their power to the wheels through hydraulic drives. They are half the weight of current American designs and will, according to Baldwin engineers, save 40% to 50% in fuel costs while still capable of developing 1350 hp. The Baldwin locomotive will be only 11 feet high and 46 feet long.

The unique design is such that the engine in the locomotive rests on its own set of trucks. By removing the housing, the entire power plant can be lifted out, a new power plant with its own wheels set down into place, the housing replaced and the locomotive is ready to resume operations within four hours. The engine changing operation ordinarily takes two days in conventional locomotives.

The New York Central Railroad has ordered one of the Baldwin units for pulling a new, low-slung, 9-car train and the New Haven road has ordered two of them. Delivery is expected to be made next spring.

Filters Detailed in Brochure

Its line of Type "PL" pipeline filters, designed for removal of water, oil, dirt and pipe scale from compressed air or gas lines, is detailed in a new brochure now available from the Air-Maze Corporation. The filters have been engineered for pressures up to 150 lbs. gauge. Standard models are furnished for pipe sizes to 2-in. while special models are available to 6-in. pipe size. Design features include extremely low pressure drop which does not exceed three ounces; ease of disassembly for inspection purposes; permanent type separator-element which may be easily cleaned in hot water; an element of brass and bronze construction; corrosion-proof steel shell; cast-iron head, threaded inlet and outlet connections; an absence of moving parts; hydrostatically pressure tested to 250 lbs. psi.

The free literature is fully illustrated, contains engineering, operating and application information. Also included is a handy table for quick computing of the correct size filter for a given installation. One page is devoted to complete specifications of all standard models. Copies may be obtained, without cost, from the Air-Maze Corporation, 25000 Miles Road, Cleveland 28, Ohio.

Flash Point Tester

The testing and distribution of fuel oils have become much safer with the introduction of the automatic flash point tester by the Precision Scientific Company, Chicago, Illinois. Primarily designed to check distillate fuel shipments delivered by transport truck or tank car, the explosion-proof device is equally useful at pipeline terminals, tanker wharves, or storage tanks, wherever fuel oils are stored or distributed in bulk. Fully equipped with Crouse-Hinds explosion-proof conduit fittings, the flash tester has been certified for use at Class L, Group D hazardous areas.

A gravity pump forces oil through the capillary of a metal block fitted with a

COMING

JUNE 15

You will be among the first to receive a copy if you order now. The same price as in former years, $10.00 for a reference volume that grows more valuable as each year passes.

pre-set thermostat The oil travels into a flash cup on the top of the block. After the incoming sample is mixed with air, it is exposed to an intermittent spark. If the sample is unsafe, the spark explodes the air-oil vapor mixture, expanding a bellows fitted with a micro switch which flashes a red light, electrically locking out the sample approval system. A safe sample, on the other hand, is signified by a steady green light throughout the test. The entire test consumes only 2½ minutes. For further information about explosion-proof electrical equipment, write File 122, DIESEL PROGRESS, Cole Station, Los Angeles 46, Calif.

Floatless Level Control

The Techniflex Corporation, Port Jervis, New York announces the release of its floatless type level control unit which is an adaptation of probe type level control units applied to industrial equipment. The standardized design for domestic and medium size commercial installations provide an economical, and easily installed unit with a power requirement of 110 v ac. By means of a transformer contained within the sealed control box all signal voltages are reduced for the complete elimination of any electrical hazard.

The electrical hookup is safe and simple through the use of a four prong plug and socket arrangement furnished with the unit. The vessel containing the probe is marked externally to show the low water level. As long as the tip of the sensing probe is immersed in water no action is called for. However, when the water level falls below the probe tip then control and/or alarm action is called in via the relay contained in the sealed control box. As an additional precaution the unit is designed to act in a fail safe manner. Where a controlled level range is required and the difference between high-low levels does not exceed 6-in. two probes are furnished in one vessel.

DIESEL ENGINE CATALOG

Volume 20

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YOUR COPY OF VOLUME 20, DIESEL ENGINE CATALOG

OFF THE PRESS AND READY TO MAIL JUNE 15—

Most editorial matter is either entirely new or extensively revised this year. The reason is that manufacturers of engines and accessories have brought out so many new models and products, and have revised so many old ones. You will need this new book to keep posted on a rapidly-moving industry.

The size and format of this new edition of the "bible of the industry" is the same as has proved so successful during the last 19 years. You will find the following sections:

•

1. ENGINES. All major manufacturers of diesel, gas, and dual-fuel engines are represented. Text is supplemented with specifications, power curves, photographs and sectional views.

2. SUPERCHARGERS & TURBOCHARGERS. This section also is fully illustrated to help you keep abreast of developments in this expanding phase of the industry.

3. TRANSMISSIONS. This section gives you the latest information on torque converters, fluid drives, and other modern means of transmitting power.

4. ACCESSORY EQUIPMENT. Recent developments in fuel injection systems, control devices, and other auxiliary units are covered in this section.

5. MARKET PLACE. You find here a convenient, time-saving listing of sources from which you can obtain the multitude of items and services needed by the growing diesel industry.

6. ADVERTISING. Information of value to you is refined and presented attractively by professional advertising talent in this important section of Volume 20, DIESEL ENGINE CATALOG.

For ease in ordering, use the form below.

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Develops New Type Metallic Nameplates

Newest development of C & H Supply Co., 415 East Beach Ave., Inglewood, Calif., manufacturers of anodized, etched aluminum "Metal-Cals," metallic nameplates, is a combination matte and shiny surfaced plate. This new Metal-Cal is said to be fully fade and weather resistant. Like the present bright metallic or the matte finish plates, they are superior to both decals and other conventional nameplates, according to the manufacturer.

The combination dull and reflective Metal-Cal is available in a wide range of colors, and is especially useful where writing, typing, or other marking must be done on the surface of the plate. The matte finish may be marked and erased as many times as desired. Like all Metal-Cals, which are backed by pressure-sensitive adhesive, the new type plate requires no rivets, screws, escutcheon pins or other fastening devices. It is available in the new paper-backed type, as well as the original type requiring brief water soaking of the metallic nameplate before application. (ITS NEW)

Vibrating Reed Tachometers

The Herman H. Sticht Company, 27 Park Place, New York 7, N.Y., has issued a new 8-page Bulletin 770 illustrating all types of the Standco vibrating reed tachometers. The various models are switchboard type instruments in round or splashproof rectangular case, or portable hand type instruments in standard or dwarf size. The bulletin also shows how to read vibrating reed tachometers and the various styles of mounting brackets which are used for mounting on rotating equipment.

Business Straws In Today's News

INDUSTRY is well into its second 1955 quarter as this is written, four months of exceedingly good business on the record. Almost any line you use to measure indicates 1955 will be the best year yet . . . automobile manufacturing, private construction of all kinds, airlines and railroads, public utilities. And, although 1954 was supposed to be a slump period, a surprisingly large number of annual reports, recently made available, showed 1954 business that was very good, sometimes record-breaking. Furthermore, almost without exception, top executives, in reporting to stockholders, have spoken in glowing terms of their prospects for 1955 and 1956.

TYPICAL EXAMPLES from the diesel and related industries: Cummins Engine Co. showed net sales 5.7%, or $5,188,694 more than 1953. Total net sales for the year were $59,184,981; net profit after Federal taxes, $2,882,314—up $952,406 or 49% over 1953 . . . Westinghouse Air Brake sales for first quarter were $37,550,000 compared with $31,021,000 in like period of 1954. Earnings increased to $1,509,000 from $922,000 . . . Quarterly profit before taxes of American Bosch was $1,660,235 compared with $1,414,028 for 1954 quarter.

ANNOUNCEMENTS OF plant expansions have been occurring with regularity. For example, Allis-Chalmers plans a $9,500,000 addition to its Terre Haute, Ind., plant and an increase in size of its Gadsden, Ala., factory . . . Utah Oil Refining Co., Salt Lake City, will spend more than $4,000,000 in 1955 for expansion of facilities and exploration. It has a three-million-dollar ultra-former now under construction upon which $1,735,000 is to be spent this year. . . . Shell Oil of Canada is increasing its Montreal East refinery's capacity from 44,000 to 55,000 barrels of crude a day. When completed in 1956, the expansion will have cost $14,000,000 . . . International Harvester Co. bought a 71-acre site for a distribution center in Columbus, Ohio.

THERE HAS even been good news in shipbuilding circles. Lloyd's Register reported 107 more ships under construction in the world than in the last quarter of 1954. Moore-McCormack Lines has invited shipyards to bid on specifications for two passenger vessels for New York-South America service. Each ship is expected to cost in the neighborhood of $30,000,000 . . . The Texas Co. has ordered a large tanker from Newport News Shipbuilding. An ore carrier has been ordered from Bethlehem Steel Co. by Iron Mines Co. of Venezuela . . . . Maritime Administration recently placed contracts for $568,588 to repair ships coming out of "mothballs."

THE ST. LAWRENCE Seaway began showing its stimulating force. About one million goes to Pacific Coast Engineering Co., Oakland, Calif., for four large gantry cranes . . . Dutcher Construction Corp., Queenstown, Md., got the job of excavating 3.1 million cu. yds. of dirt and to build a dike on a bid of $2,197,843.

GAS AND OIL transmission lines continue booming along. Tennessee Gas Transmission has earmarked $10,000,000 for an accelerated drilling program this year. It expects to drill or participate in 150 to 175 wells this year, far more than last year . . . The same company has been authorized by the Federal Power Commission to construct 370 miles of natural gas lines at an estimated cost of $35,400,000. While this project is a substitute for one announced earlier, this is more costly by twelve millions . . . United Gas Pipe Line Co. is seeking permission to extend its lines and add a 330-hp compressor station at a cost of $8,300,000 . . . Southern Counties Gas Co. wants the California Commission to ok laying 31 miles of 30-in pipe at a cost of $2,500,000 . . . Colorado Oil & Gas Corp. has started its 1955 program of developing 100 wells . . . Texas Eastern Transmission Corp. has plans for converting the "Little Big Inch" from natural gas to products and building a substitute gas line. They talk in terms of a $86,000,000 . . . San Diego Gas & Electric Co. is installing two 1100-hp gas engine (Clark Bros.) compressors in a new $700,000 station in Southern California —one phase of the $2,500,000 project which will complete "looping" the Texas-California pipeline system on the 210-mile stretch between Los Angeles and the Colorado River.

CREDIT LINES that will stimulate business in our industry have been extended by Export-Import Bank to: General Motors Overseas, $10,000,000 to finance export of diesel-electric locomotives, diesel engines and generators, trucks, buses and earth-moving equipment; Deere & Co. $7,600,000 for farm tractors and other machinery; Cooper-Bessemer, $900,000 for engines, compressors, generators, pumps; Goodman Mfg. Co., $500,000 for mining and contractor's equipment.

ALCO (formerly American Locomotives) has a backlog of 100 locomotives; delivered 65 in first quarter of 1955 compared to 178 for all of 1954 . . . Two California irrigation districts are raising $41,500,000 with bond issues to build three dams on the Stanislaus River . . . Voters of San Diego approved a $9,460,000 bond issue to expand harbor facilities of the busy port.

THE TRANE COMPANY, LaCrosse, Wisc., is working on an order received from the Santa Fe Railroad Co. for 140 freight car refrigeration units. The refrigerated cars themselves are being built by the Santa Fe in its West Wichita, Kansas, shops. H. Corbyn Rooks, Trane Vice-President, expects his company's sales this year to reach more than $55,000,000. Sales in 1954 were a record $50,200,000.

THE Missouri Pacific Railroad operates a fleet of 873 dieselized units, including 688 locomotives placed in service since 1948, at a cost of over $100,000,000. This company reports that, for the first two months of 1955, net income was $1,453,371, compared with net income of $327,988 for the first two months of 1954.

How much **of your engine maintenance bill is due to repair of breakdowns that could have been avoided—*if you'd had advance warning?***

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Cylinder Overload **Preignition**
Scaled Jackets **Clogged Ports**
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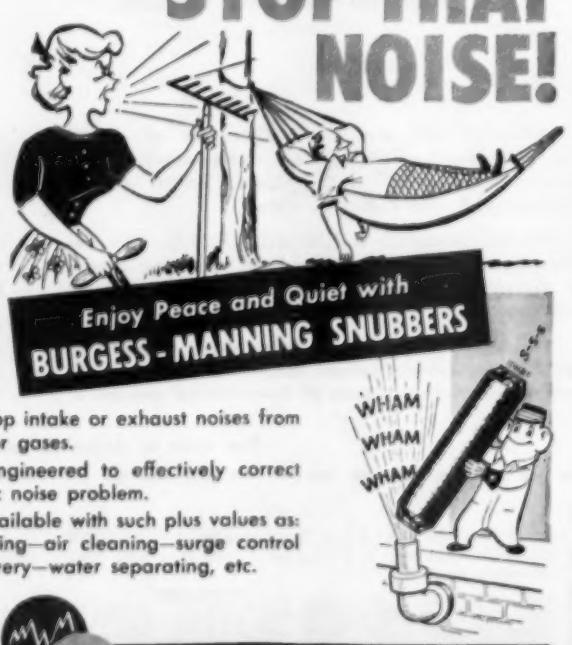

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ALTHOUGH BALDWIN-Lima-Hamilton's consolidated net sales and income both were lower for the first quarter than a year ago, unfilled orders and orders received both were up. Sales for the first quarter were $37,748,982 compared with $52,297,478 a year earlier; net income $909,380 compared with $1,356,361 for first quarter, 1954. Unfilled orders March 31 amounted to $96,176,703 compared with $90,659,568 at the same time in 1955, and orders received the first three months of this year were $57,068,218 against $25,612,882 for the 1954 first quarter.

P. O. PETERSON, president, Mack Trucks, Inc., told shareholders that sales in the first quarter increased 39% over the same period of 1954 and earned more than in the entire year of 1954 . . . Robert F. Black, president, White Motor Co. reported unfilled orders at the highest level in two years. Commercial sales in the first quarter were nearly a million higher than for same quarter of 1954, but government business declined more than enough to offset this. Mr. Black told stockholders that the engine division of National Supply Co. was obtained for approximately $4,000,000 and that the net book value of the new division, after adequate reserves, was about $7,500,000.

MILITARY ORDERS announced recently include: Westinghouse Electric Corp., $13,151,289 for compressor drives; Consolidated Diesel Electric Corp., $10,036,748 for engine generator sets; Continental Motors Corp., $4,498,804 for 1015 engines and spare parts.

BIG, FAST TAX WRITE-OFFS recently granted by Office of Defense Mobilization include: Transcontinental Gas Pipe Line Corp., 25% of $79,497,703 on natural gas pipeline facilities; Union Pacific, three certificates to write off 40 to 55% of $10,158,000 to be invested in diesel locomotives and terminal facilities at Green River, Wyo. . .Cincinnati, New Orleans & Texas Pacific Railway, 55% of $2,050,000 for diesel locomotives.

Injector Tube Replacer Kit

Bacharach Industrial Instrument Company, Pittsburgh, Pa., has added an injector tube replacer kit to its line of General Motors Series 71 tools. This kit features a newly developed tool for removing the injector tool from the cylinder in one simple operation, doing away with four operations required with previously available tools. The tool incorporates a gripping device having sharp, slip-proof teeth which, when expanded by tightening a screw drive, bite into the internal wall of the injector tube, and the injector tube may be pulled out of the cylinder head simply by turning the drive screw which projects from the top of the tool.

The kit contains six tools which perform all factory-recommended operations of injector tube replacement—from removal of the old tube and installation of the new tube to the necessary flaring, reaming and facing operations of the new tube after installation.

The tools are fitted in a sturdy steel case with snap-catch locks and carrying handle. A tool board in the case has contoured cut-outs for each tool to provide convenient, safe storage. Complete particulars are given in Leaflet 904, available from Bacharach Industrial Instrument Company, 7301 Penn Avenue, Pittsburgh 8, Pa.

Two Chicago Appointments

Two appointments in its Chicago sales district have been announced by Alco Products, Inc. According to C. F. Venrick, regional sales manager, William A. Powers has been promoted to regional service manager and C. S. Middleton has been named renewal parts sales representative.

A former machinist and relief foreman on the Chicago and North Western Railway, Mr. Powers joined Alco in 1946 as a locomotive service engineer, and has since worked chiefly out of the company's Chicago office. Mr. Middleton joined Alco as a road-service apprentice and soon after joined the U.S. Navy. He was discharged in 1946 as a motor machinist mate 1/c with both diesel engine operation and maintenance, and underwater demolition experience. Rejoining Alco upon his discharge, Mr. Middleton worked as a locomotive service engineer up to the time he assumed his present duties.

Named President of Canadian Allis-Chalmers

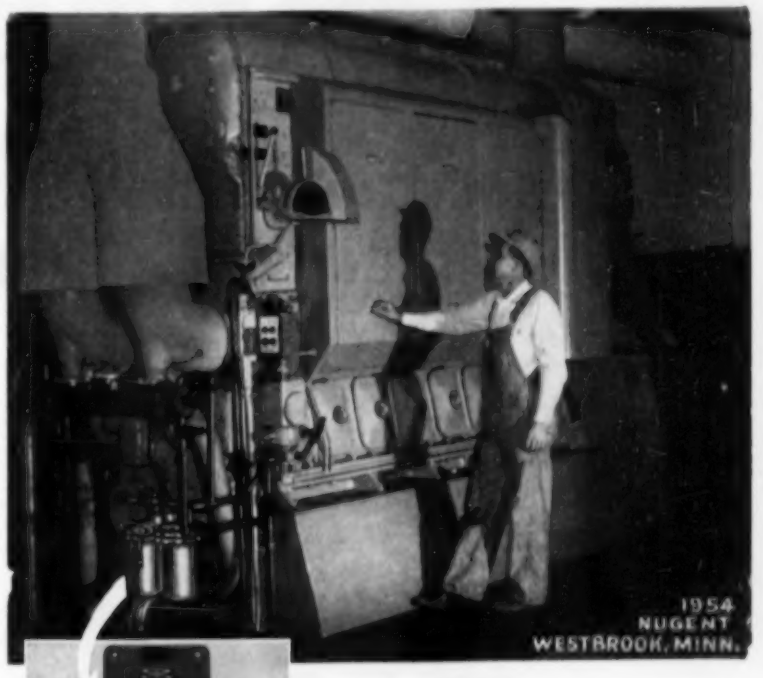
Election of Harold M. Schudt as president, Canadian Allis-Chalmers Limited, was announced recently by J. L. Singleton, vice president in charge of the general machinery division, Allis-Chalmers Mfg. Co. The general machinery division of the parent Allis-Chalmers Company is in charge of operations of Canadian Allis-Chalmers Limited.

He replaces Mark C. Lowe who resigned after being president of Canadian Allis-Chalmers Limited since 1951 and affiliated with the Company since 1947. In his new capacity, Mr. Schudt will be in charge of operations which include general offices in Lachine, Quebec, manufacturing plants at Lachine and St. Thomas, Ont., and sales offices in Montreal, Toronto, Winnipeg, Calgary and Vancouver.

Appointed General Manager

The appointment of Frank E. Kalbaugh as general manager of the newly formed Southern Pacific Pipe Lines, Inc., was announced recently by E. E. Mayo, vice president. Mr. Kalbaugh, former superintendent of Southern Pacific railroad's Salt Lake Division, has been serving with the government as general manager of the Alaska Railroad. The pipe lines of the new company will be constructed from Los Angeles and El Paso refinery areas to Tucson and Phoenix, covering a total of about 800 miles.

Mr. Kalbaugh's office will be in the Pacific Electric Building, 610 S. Main Los Angeles.



NEW

Power Plant Diesel

protected by Nugent

Fuel Oil Filters

A power plant can't afford "second best" when it comes to diesel fuel oil filters. *That's why* leading diesel manufacturers install Nugent Fuel Oil Filters on nearly every engine slated for power plant service. *That's why* a Nugent Duplex Fuel Oil Filter was included as original equipment on the 960 HP Fairbanks, Morse recently installed for municipal power service at Westbrook, Minnesota.

Nugent Duplex Fuel Oil Filters of this type utilize an inexpensive bag type cartridge that actually removes 99.8% of all solid foreign material from the fuel oil. The cartridge lasts a long time, is easy to replace and presents 20 times more filtering area than any other charge of comparable size. The filter covers, valve manifold and bracket is one casting. Units can be operated separately or in parallel and slow manipulation of the valves will not cause stoppage or high pressure.

You, too, can't afford "second best" when it comes to fuel or lube oil filtering. So, take a tip from leading diesel manufacturers and investigate the possibilities of Nugent Filtering units for your own equipment.

Wm. W. Nugent & Co., Inc.

415 N. Hermitage Ave. CHICAGO 22, ILLINOIS

OIL FILTERS, CLARIFIERS AND PURIFYING SYSTEMS, TELESCOPIC OILERS, OILING DEVICES, SIGHT FEED VALVES, FLOW INDICATORS

Established 1897

New Power For A Veteran Tug

Freshly painted and with new power below decks, the 55-year old towboat, *Manzanita*, owned by the Olson Tugboat Company of Tacoma, Washington is now an entirely new boat both from the standpoint of appearance and performance. According to John G. Olson, president of the tugboat company, the craft with her present 409 usable diesel horsepower today tackles towing jobs that heretofore required two boats to handle. And although her horsepower was more than doubled, the new power plant—a General Motors 6-110 Tandem-Twin diesel—was installed with practically no disturbance to her superstructure and without the need of costly heavy duty rigs.

The *Manzanita*, also known during her long career as the *North Star* and the *Queen City*, is presently being used as a barge and log towboat. She was formerly operated exclusively in Pacific waters off Oregon and Washington. But with her increased power and cruising radius her operations are now being extended to waters off British Columbia and Alaska. The craft is 85 feet in length, has a beam of 18.5 feet and a draft aft of nine feet. She is of wood construction with a tonnage of 78 gross tons.

Her Tandem-Twin powerplant consists of two of General Motor's 6-110 marine diesels arranged in line and driving a single output shaft. With the engines turning a 60x50 3-blade wheel through 5 to 1 reduction the craft has been logged at 10 knots at 1600 engine rpm. She now carries 5000 gallons of diesel fuel which is sufficient for a run of approximately 200 hours. The craft is operated both forward and in reverse by a single Cliffs S. Mathers control lever. This feature together with the quick response of her two-cycle diesels provides excellent maneuverability, according to her owners. She was repowered by Evans Engine and Equipment Company of Seattle.

The World's Leading Manufacturers of
FUEL INJECTION EQUIPMENT
for Diesel Engines

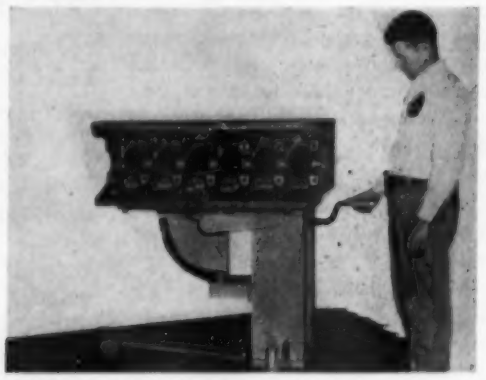
DEPOTS AND SERVICE AGENTS IN OVER 100 COUNTRIES

C.A.V.

C.A.V. DIVISION OF LUCAS ELECTRICAL SERVICES INC., 653, TENTH AVENUE, NEW YORK, 36, N.Y.
Sales Office: 14820 DETROIT AVENUE, CLEVELAND, 7, OHIO.

AP 174-715

Engine Stand



Clayborne Manufacturing Company announces the new #900 engine stand illustrated in addition to their line of engine stands. The #900 stand takes a mechanic off a platform and permits him to stand on the floor, bringing his working position to an ideal height on such engines as General Motors 6-110. The stand is designed with a 90 degrees segment worm and worm gear which tips the engine over on its side so it may be rotated half a turn and lowered in the reverse position. This engine stand may be installed as a pedestal type or equipped with large heavy-duty casters to adequately handle engines up to 6000 pounds. Approval has been expressed at the convenience available with this stand to install piston assemblies while the engine is lying on its side within easy reach from the floor. (ITS NEW)

Atlanta District Manager

F. L. Humphrey, Jr.

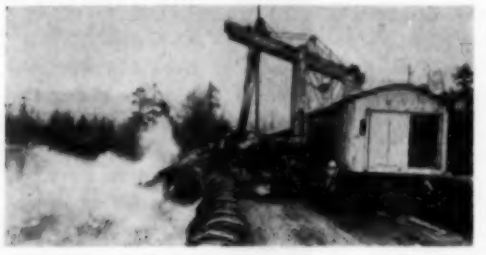
Elliott Company recently announced the appointment of F. L. Humphrey, Jr. as district manager in their Atlanta territory. Mr. Humphrey joined the company in 1928 following his graduation from Georgia Institute of Technology as an electrical engineer. After completion of the Elliott training program, he was assigned to their Atlanta office as a field engineer. Entering the army in 1942, he served for four years, returning to the Atlanta office in 1946, and becoming assistant district manager in 1954.

Appointed to Cooper-Bessemer Tulsa Office

Donald E. Dixon

The assignment of Donald E. Dixon to Cooper-Bessemer's Tulsa office as field engineer is announced by R. F. Lay, general sales manager of The Cooper-Bessemer Corporation, Mount Vernon, Ohio. In his capacity as field engineer, Mr. Dixon will devote his activities to both application and sale of engines and compressors for service on pipe line transmission for petroleum and chemical processing in the Oklahoma area. He will work under the direction of Byron L. Potter, Cooper-Bessemer vice-president and branch manager of the Tulsa field office. Prior to his appointment to the Tulsa branch office, Mr. Dixon was manager of the Compressor Section, Sales Department, at Cooper-Bessemer's plant in Mount Vernon, Ohio. In this capacity his responsibilities included supervision of the home office sales sections on engine and motor-driven, reciprocating and centrifugal compressors. A member of the American Petroleum Institute, Mr. Dixon is an engineering graduate of Oklahoma A & M.

Replaces Steam on Log Unloader



A Marion railroad crane used by Weyerhaeuser Timber Company at their Raymond, Washington plant "kicks" logs into the Willapa River for rafting at the rate of 110 truck loads per day. Although formerly a steam crane, it is now operated by air from a Gardner-Denver compressor powered by a General Motors 6-71 diesel engine. The steam boiler still serves as the unit's air storage tank. Propulsion power is supplied by the diesel direct.

Manager of Commercial Research

Gordon P. Vega

Gordon P. Vega has been appointed manager of Commercial Research of Enterprise Engine & Machinery Co., subsidiary of General Metals Corporation, according to an announcement by Arthur W. Ostrander, general sales manager of the firm. Mr. Vega was formerly Market Research manager of an eastern metal fabrication company, and prior to that held positions in marketing, sales and general administration for various Kaiser-affiliated companies. His duties will include market research, sales analysis and sales development. He attended Stanford University and is a graduate of the Stanford Graduate School of Business.

For Dependable Lubrication
in **Tough Service**

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FORCE FEED LUBRICATORS

Engineered to the Specific Needs of Your Particular Diesels

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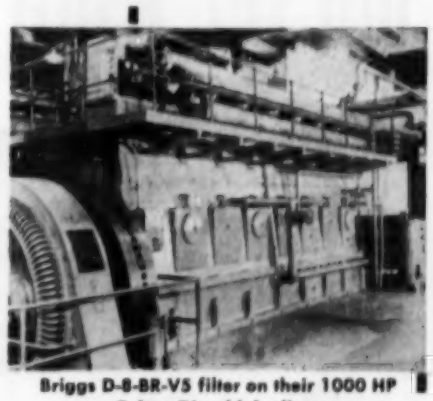
LE SUEUR LIGHT AND POWER IS BRIGGS EQUIPPED

MEN WHO ARE CLOSEST to high performance diesels almost always specify Briggs because . . . dollar for dollar . . . hour for hour . . . gallon for gallon . . . on-the-job experience proves that it's sound economy to use THE filter that does the job engineers and maintenance men demand.



Briggs D-8-BR-V5 filter on their 1000 HP Fulton Diesel lube line.

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A Briggs engineer is ready to serve you without cost or obligation. If your problem concerns oil filtration, you'll find he can give you some mighty sound suggestions. Write today.

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RIVER ROAD, WASHINGTON 16, D. C.

Briggs TF-18 secondary fuel filter as installed on their latest Worthington engine.

THE AMAZING NEW
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Models "71", "110", etc.
Delivers over 950 pounds pop pressure when assembled with new parts — 25% to 33⅓% more than other springs when assembled with old parts.
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IMMEDIATE
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That genuine Stewart & Stevenson "Remanufactured" injectors* are available for as low as $12.50** each exchange.

Why accept less than the genuine Stewart & Stevenson Remanufactured Injector exchange. Stewart & Stevenson Remanufactured Injectors are reconditioned using only genuine GM Detroit Diesel factory engineered parts. Fast shipping service anywhere in the U. S. Write or call Stewart & Stevenson today.

*Series 71 Injectors
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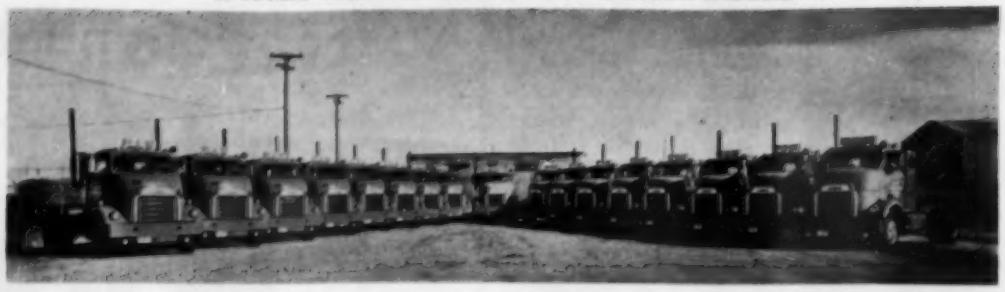
P.I.E. ADDS 20 GMC TRACTORS



TWENTY new General Motors tractors recently were placed in operation by Pacific Intermountain Express on its routes between Denver and Chicago and Denver and St. Louis. All units are powered by GMC 6-71 diesel engines equipped with the GM Twin Hydra-Matic transmission.

The GMC diesels are governed at 2300 rpm, giving a maximum gross horsepower of 196; a net of about 180 hp. The engines are fitted with 60 mm. injectors and utilize aluminum parts for weight reduction as follows: balance weight cover; crankshaft cover; cast hand-hole cover; oil filter base and support assembly; and blower housing.

The Twin Hydra-Matic transmissions and two-gear reduction units were introduced last year, and marked the entry into the trucking field of the automatic transmission. (See DIESEL PROGRESS, June 1954 for cutaway drawing and full details.)

The new P.I.E. tractors were manufactured by the GMC Truck & Coach Division at Pontiac, Mich. They are Model DFX922-67. Features of the cab, according to GMC officials, include: aluminum sleeper boxes which were reduced in height so the trailer thermo-king would have adequate clearance;

side-mounted, recessed spare tire carrier; aluminum wheels and Timken Q-100 rear axles with aluminum parts; Timken front axles with nylon bushings; 10.3-20-14 ply rating, high-pressure tires; strip-away features permitting easy access to vital above-frame engine parts; 80-gal. left-hand aluminum step-tank; 100 ampere alternator instead of standard generator; power steering; special lightweight frame cross-members; and special cable-type parking brakes.

GMC engineers collaborated with P.I.E. executives in designing the sleeping compartment of the cabs. Because of this improved feature, the automatic transmission, and the power steering, the new rigs are expected to prove popular with Pacific Intermountain Express drivers.

Cummins Distribution Manager

Loyd E. Williams

The promotion of Loyd E. Williams to manager-distributor, Cummins Engine Company, Inc., Columbus, Indiana, has been announced by C. R. Boll, Cummins' vice-president, sales. Mr. Williams had been Rocky Mountain regional manager for Cummins since March, 1950. His headquarters were in Denver, Colorado. In his new position, Mr. Williams will be in charge of the operation of the Company's 12 regional offices, and the handling of domestic distributor activities. He succeeds Paul J. Every, who is now general sales manager. Following service in the U.S. Navy during World War II, Mr. Williams joined the Buda Company and was Northwest division manager of that firm until joining Cummins in 1950. A native of Salem, Illinois, Mr. Williams is married and has one daughter.

Assistant Sales Manager

Fred K. Krell

Ladish Co., Cudahy, Wisconsin, prominent manufacturer of forged and seamless welding fittings has recently announced the appointment of Fred K. Krell as assistant sales manager, Fittings Division. Mr. Krell comes to his position after many years broad experience in the manufacture and distribution of pipe fittings.

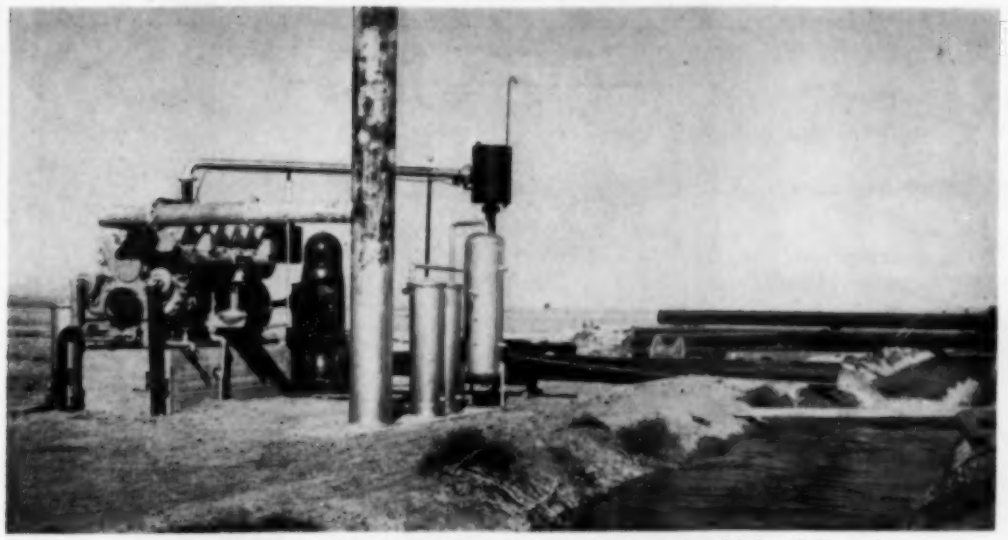
Grinding and Hard-Chrome Plating of Diesel Engine Crankshafts

ALL SIZES
Complete facilities for grinding, plating, Magnafluxing, and electrically-controlled heat-treating.
Largest hard-chrome plating plant in the Mid-Continent area. Experience • Quality • Precision

LANE
PLATING WORKS
5322 BONNIE VIEW RD.
DALLAS, TEXAS

ARIZONA RANCH INSTALLS NEW VLR-SERIES WAUKESHA

By MARK OGDEN



Natural-gas Waukesha, rated 810 hp, equipped with Winslow gas and lube oil filters, is set for 400-ft. irrigation pumping on Anderson Brothers Farms.

Anderson Brothers Farms of Casa Grande, Arizona, have in operation a new Model VLROB-12 Waukesha natural-gas engine. Purchase was made from Waukesha Southwestern Engine Parts & Manufacturing Co., Phoenix, and installation was completed late in March. As a new unit in the Waukesha line, this engine was fully described in the December 1954 issue of DIESEL PROGRESS, pages 26 and 27. There are four earlier model Waukesha engines in use on the ranch.

The reasons why the ranch owners installed this powerful engine are more or less typical of what is going on at this time throughout Arizona. Twenty years ago, 100 feet was considered to be about the limit that water could be lifted. However, as the water table dropped lower and lower, it became necessary to drill wells deeper and to lift water to ever greater heights. Manufacturers were equal to the occasion and built pumps and engines that could bring up the water. Now, 300-ft. wells are not uncommon.

Three hundred feet is the depth of the Anderson Brothers well. However, the pipe extends to 425 ft., with the bowls set at 400 ft. Furthermore, Waukesha representatives are confident that this particular engine, with the gear-head, drive and pump that have been engineered onto it, can easily go to 600 ft. They are looking forward to the day when 1000-ft. wells will be a possibility.

In addition to needing more power for greater depth, there is a general need for more water because Arizona farmers are double-cropping to offset lower margins of profit and higher production costs. On the Anderson farms, for example, while cotton is the basic crop, grain or vegetable crops are sandwiched in between the cotton seasons.

The new 12-cylinder Waukesha engine is rated at 810 hp, turning at 1000 rpm. It drives the Lane & Bowler pump through a Watson-Spicer drive shaft which has a universal joint on each end. The pump's capacity is 4000 gal. per minute. The gear-head is an Amarilla 7BL.

The engine is equipped with a Winslow fuel gas filter and a Winslow full-flow lube oil filter. Engine cooling is achieved by means of a large free-flow cooler. The muffler stack is the design of one of the owners,—George Anderson. It is a 20-ft.-high well casing of 18 in. Operating unattended, as is customary with irrigation pump units, the Waukesha is protected with several safety devices. One is a Mercoid installed in such a manner that it will shut off the engine if water stops flowing in the discharge pipe.

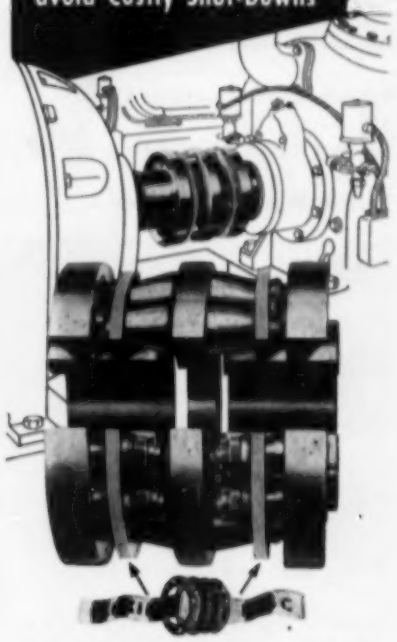
Opens Washington, D.C. Office

W. T. (Bill) Wilson

Opening of an Eastern application engineering office in Washington, D. C. is announced by Western Gear, well-known manufacturers of gears and special machinery. The new office is located at 1101 Vermont Avenue. The telephone number of the new D. C. office is Sterling 3-0974. W. T. (Bill) Wilson, associated with Western Gear for many years and previously in the application engineering department of Western Gear's Texas plant, will be in charge of the Washington office, where engineering information and service on the diverse line of Western Gear products will be made available in that area.

Western Gear is regarded as one of the nation's largest manufacturers of gears, mechanical power transmission equipment and custom engineered machinery. Established in 1888, the company operates plants at Lynwood, Pasadena, Belmont and San Francisco, Calif., Seattle, Wash., and Houston, Texas. Executive offices are at Lynwood.

Specify THOMAS ALL METAL FLEXIBLE COUPLINGS for Power Transmission to avoid Costly Shut-Downs

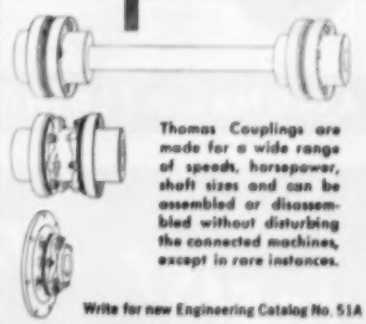


Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

Typical Main Drive Application in Heavy Duty Marine Service

DISTINCTIVE ADVANTAGES

FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.



Thomas Couplings are made for a wide range of speeds, horsepower, shaft sizes and can be assembled or disassembled without disturbing the connected machines, except in rare instances.

Write for new Engineering Catalog No. 51A

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA, U.S.A.

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Grinding Machines to handle crankshafts from the smallest up to those with a stroke of 16" and length of 200". Complete grinding service for locomotive, stationary, marine and compressor crankshafts. Also camshaft repair service for industrial, marine and locomotive engines.

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DIESEL ELECTRIC GENERATOR SETS
20 KW TO 1200 KW

Fairbanks-Morse 1136 KW. on our test stand.

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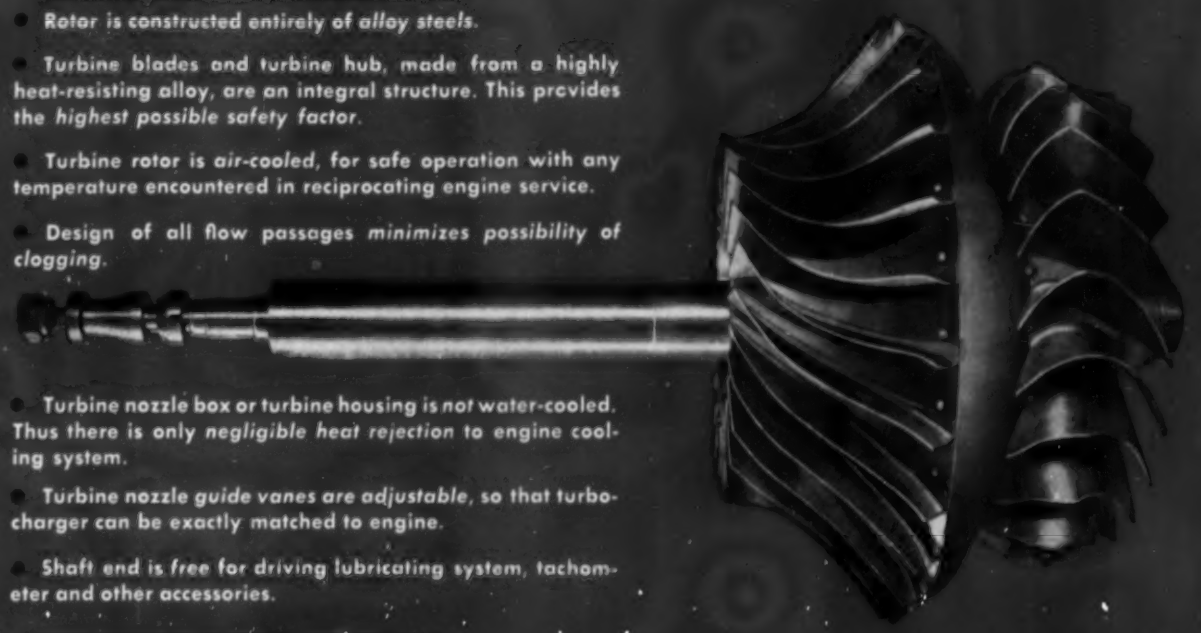
DE LAVAL
HIGH PRESSURE TURBOCHARGERS

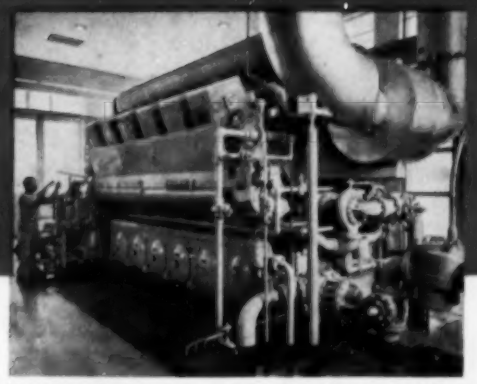
increase output by 100% or more

- Rotor is constructed entirely of *alloy steels*.
- Turbine blades and turbine hub, made from a highly heat-resisting alloy, are an integral structure. This provides the *highest possible safety factor*.
- Turbine rotor is *air-cooled*, for safe operation with any temperature encountered in reciprocating engine service.
- Design of all flow passages *minimizes possibility of clogging*.

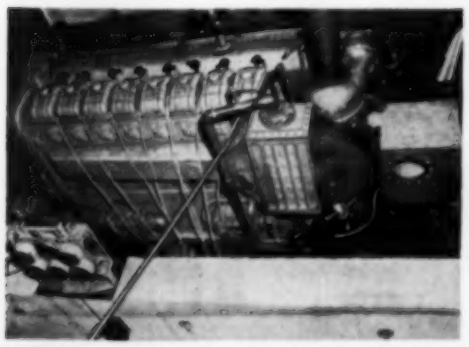


- Turbine nozzle box or turbine housing is *not* water-cooled. Thus there is only *negligible heat rejection* to engine cooling system.
- Turbine nozzle *guide vanes are adjustable*, so that turbocharger can be exactly matched to engine.
- Shaft end is *free* for driving lubricating system, tachometer and other accessories.

Exclusive
MONOROTOR
construction shows why



Here is a De Laval Type A-14 Turbocharger installed on a V 12-cylinder, 4-cycle diesel engine.



A De Laval Type B-8 Turbocharger, shown on test, is mounted vertically on an 8-cylinder, 2-cycle diesel.

These De Laval high pressure turbochargers represent the newest development in diesel engine design. In many cases they can double the output of heavy-duty diesel, gas and dual-fuel engines without increasing thermal loading. • They offer pressure ratios of 3:1 as well as far higher compressor and turbine efficiencies than those found in conventional turbocharger systems.
• De Laval turbochargers are self-adjusting to engine loads, can be used on 4- *and* 2-cycle engines. *Write for Bulletin 8000* giving compressor curves and flow range diagrams.

DE LAVAL

Turbochargers

DE LAVAL STEAM TURBINE COMPANY
883 Nottingham Way, Trenton 2, New Jersey

D-294

For out in the Atlantic, the 3800 hp Cooper-Bessemer powered CURB is shown preparing to take the fire-gutted freighter BLACK GULL in tow.

How **COOPER-BESSEMER POWER** helped rescue the "Black Gull"

RECENTLY, an early morning call informed Merritt-Chapman & Scott's salvage station at Staten Island, New York, that the Norwegian freighter BLACK GULL was abandoned and burning 165 miles away. The 223-foot CURB, powered by four 8-cylinder Cooper-Bessemer diesels, left Staten Island immediately and reached the stricken ship that same evening. Within 33 hours the BLACK GULL was successfully towed back to New York while still ablaze.

One of three Cooper-Bessemer powered "ocean-lifeguard" sister ships operated by Merritt-Chapman & Scott, the CURB has a long record for fast, dependable rescue work under all possible operating conditions.

The vital rescue work performed by the salvage vessel CURB requires the 24-hour power availability that is assured when Cooper-Bessemer diesels are in the engine room.

If you demand similar rugged and continuous Diesel performance, check with your nearest Cooper-Bessemer office for complete powering details.

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